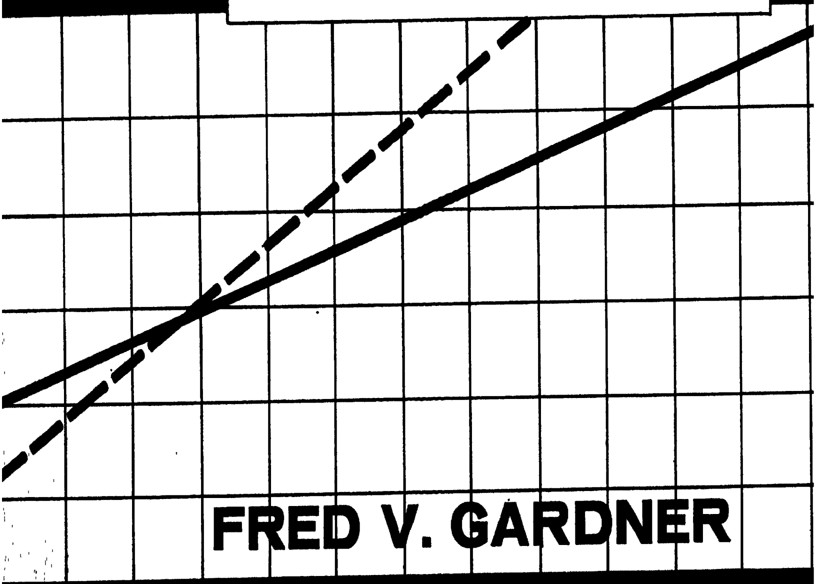
PROFIT MANAGEMENT AND CONTROL



FRED V. GARDNER

McGRAW-HILL INDUSTRIAL ORGANIZATION
AND MANAGEMENT SERIES

PROFIT MANAGEMENT AND CONTROL

By FRED V. GARDNER

Member, Fred V. Gardner and Associates;
President, Smith Steel Foundry Company

Here is thorough analysis and explanation of profit control, to help management produce more profits through practical application of profitgraphs and the breakeven point. The book offers you a new approach in coordinating capitalgraphs and profitgraphs and tying them in to the fundamental balance sheet and profit and loss statements.

A full, rounded, and complete treatment of breakeven points is given, with special emphasis on their use in management decisions in such areas as planning, measuring profit efficiency, determining selling prices, and labor relations.

One of the important features in the book is the use of breakeven points in orecasting and determining sound bonus plans for key executives and in educating supervisors and union officials as to he impact of cost increases on profits.

Actual illustrations support the material, nd the book covers the advanced thinking in profit management now being employed by a number of companies.

McGRAW-HILL INDUSTRIAL ORGANIZATION
AND MANAGEMENT SERIES
L. C. MORROW, *Consulting Editor*

PROFIT MANAGEMENT AND CONTROL

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Profit Management and Control

FRED V. GARDNER

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IN MEMORY OF MY DAUGHTER

Alice Anne

1930–1950

PREFACE

Twenty years is not a very long time, in terms of history; yet, the last twenty years have had enough changes packed into them for an ordinary century. The effect, in retrospect, is dizzying. Along with this complete change in our way of life have run in parallel the comparable changes in improvement in techniques in producing goods in American industry. Not only have we grown in astronomical proportions, but we have coped with all the physical techniques involved in satisfying a demand for greater quantity and higher quality.

As one looks in retrospect, however, and especially one, like the writer, who is constantly comparing the past with the present and appraising the future, one finds that we have had startling weaknesses in this otherwise fabulous industrial growth. Management's techniques in coping with product growth have developed much faster than his ability to measure and express these values. The costs of keeping costs have too often become out of proportion to the values which accrue. Methods and procedures in expressing value from fundamental details to the most formal accounting statement have not kept pace with the dynamic physical development.

There are two major reasons for this discrepancy: (1) profits have been too easy to come by for too long a period of time, causing a dulling of "tight ship" cost thinking, and (2) the people who by inference are custodians of value think in terms of figures which are bound in a "straight jacket" of accounting and cost techniques. These methods may still be satisfactory for accounting requirements, but today are unsatisfactory as a medium to control a *dynamic* running management that has changed so drastically in needs the past few years.

To make it possible for this paper record deficiency not to further retard the problem of running a "tight business ship" requires a complete new appraisal of accounting techniques, now employed by American industry, and used for operating control. This review is in order to ensure a new sense of usefulness to an operating organization which must have *honest* figures *quickly* expressed in *their language* detailed where the *money is spent.* This requires an engineered plan of figure development making it easier to use modern high-speed equipment and ways to ensure "organizational chart" control without undue duplicating of efforts to satisfy accounting.

This book deals with the problems involved in this procedure. The binder of this new technique is the breakeven point so designed that it ties together the requirement needed in valuing *dynamic* managements and still maintains acceptable accounting requirements where the major exemplification is the safeguard for the casual observer through formal yearly statements in deference to the managerial emphasis by using running commentary of the facts which makes these annual statements possible.

This book is not entirely the thinking of the author alone. It would have been impossible to complete it in a presentable form without the tolerant, stimulating, and practical help of "Mike" Hill, my partner. Special thanks are also due to Robert Wuerch, formerly associated with Fred V. Gardner & Associates, now Treasurer of Zwicker Knitting Mills, Appleton, Wisconsin, to Randolph Kenny, Treasurer of Paragon Electric Company, and over one hundred others who have read the book in draft form. They have made many practical suggestions with the thought of making it easier for management men like themselves to get at the heart of a profit-control problem without struggling with a mass of detail.

FRED V. GARDNER

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Section One

BASIS FOR PROFIT CONTROL

This section faces squarely the basic task of management. That task is to produce a profit which represents a fair return on the capital employed.

Unfortunately, profits do not just "happen"; they must be produced. Nor is there any guarantee of profit production in any particular volume of goods and services which may be produced and sold. High volume, that is, high in relation to the scale of the particular enterprise, may increase the probability of profit. But volume does not in itself make any promise of "fair return."

When management can plan its profit performance, project its plans to possible multiples of volume, and then realize its profit plans, only then can it be said to have achieved *profit control.* Such control calls for a sophisticated understanding of how profits are actually produced and of the laws underlying profit generation. Objectives cannot be confused with accounting technique and tradition.

Toward this kind of understanding of management's primary task is this section addressed.

CHAPTER 1

WHAT IS MANAGEMENT?

Introduction. Management is the keystone of policy and procedure in our system of capitalistic enterprises and can, therefore, make or break our economic way of life.

In its business tasks of planning, organizing, operating, and adjusting for new technologies, management finds itself harassed, restricted, confined, buffeted, confused, and driven off course by soaring taxation, restrictive legislation, regulatory fiat, organizational pressures, and plain community responsibilities unknown in yesteryears. With immensely larger productive capacities presenting greater complexities both technologically and in human relationships, management today carries even greater responsibility for the general economic and human effects of its decisions. Too many of our past decisions—poorly made, poorly stated, and poorly executed—today lie deep among the obstacles which impede our progress. How and what management can manage, and how it can better its economic decisions, is the subject of this book.

What Is Management? In large, management is effectively and foremost the custodian of the profit system in that management directs the use of capital in the entire range of business activity. But tenure of custodianship lies in continued effective use; tenure rests upon efficiency and ability in controlling losses and enhancing profits in a system in which profit or loss can attend any venture. Over a cycle of years, an average fair return on the capital employed is the final criterion.

Though capital return may be the final measure, management does not work with money alone; management works with money and people and things, all that is physical and tangible in the business enterprise. *Management is the unseen force that drives* *all that is physical in obtaining* turnover *for fair return on investment.*

Management Is an Unseen Force. To those who are being managed, and who recently may have felt the impress of criticism, the boss does not seem to be very "unseen." Even at a one-man-boss level, the force that makes one comply with a directive is often vague, variable, and without body. The reasons for a directive are likewise often vague—the result of internal, external, governmental, psychological, or other influences.

As business firms grow and lines of authority become complex patchwork, the force of management becomes more unseen, and unless extreme care is exercised, the objectives of management become more unknown. As decisions flow through channels, they are often not clearly expressed, and too often distorted, in terms of dollars and cents.

Consider how the English language continuously changes. The word "black" is said to have originated from the French word *blanc* meaning "white." The word "sap" springs from the Latin word *sapiens* meaning "wise."

The original speaker intends one idea; his hearer understands another and may pass still another meaning on to a third party. Management men find themselves continually dependent upon interpretations of words.

This condition handicaps management, who must frequently pass orders through three or four levels of supervision to the level where action is finally taken. The orders are too frequently subject to different interpretations, to different modes of expression, and thus to different action from that originally intended. Where costs are involved, the greatest of care must be taken to ensure that action originated in behalf of management is that which is intended. Conversion of requirements and instructions to dollars and cents establishes a common denominator for all, a denominator which can be directly proportioned. Remember, money is actually spent poorly or wisely in the third or fourth level of authority. The decision may be made at the top, but the dollar efficiency is made at the lower levels.

Management Is the Unseen Force That Drives. The word "drives" is harsh. In fact, personnel counselors would say, "Management does not drive. It leads." In our usage the word "drives" is synonymous with the process of operating an automobile. An automobile is not led; it is driven with an impact, a force, a thrust into the future at varying speeds. The greater the speed, the greater the hazards.

Like the automobile, business enterprise is a dynamic, moving, thrusting force; hazards increase as speed and obligations increase. Business, like society in general, has speeded up. One is reminded of people in the last century who, upon missing the slow, irregular means of transportation then available, quietly waited a day or two for the next coach or train. Today, if people miss a single turn in a revolving door, they are frustrated and irritated.

"Drive," therefore, in management, means the control of thrust and action, of movement toward unknown conditions and problems in jagged segments of *time* or *turnover.*

Turnover Is Time. *Management Is the Unseen Force That Drives All That Is Physical in the Process of Obtaining Turnover.* "Physical" refers to the M's of business, the individual ingredients with which management must work in accomplishing objectives in the process of converting money to money. Thus, management is the driver of a high-speed (turnover) mechanism, a force which can do damage to self, riders, and innocent bystanders if not controlled. Control is not at random check points (monthly or yearly) as accounting leads us to believe. Running a business is a continuous process because parts of the enterprise are moving every second, each segment in its own orbit at its own speed. The charted M's of business illustrate this continuous movement in which the several segments act, coalesce, and produce effects which appear in the operating results with varying rapidity, time, and magnitude.

Whether management be engaged in processing steel or in selling wheat, the problem is the same—to combine physical components in the most economical proportions and to obtain the ultimate, most acceptable product commensurate with a fair return on the capital employed.

In the process of turnover the physical components used in creating the business product or service are joined together in jagged sequences of varying *time* proportions of policy, operating style, distribution channels or methods, production schedules, product development, and capital availability as internal custom or external influence may dictate. The *time* required to apply

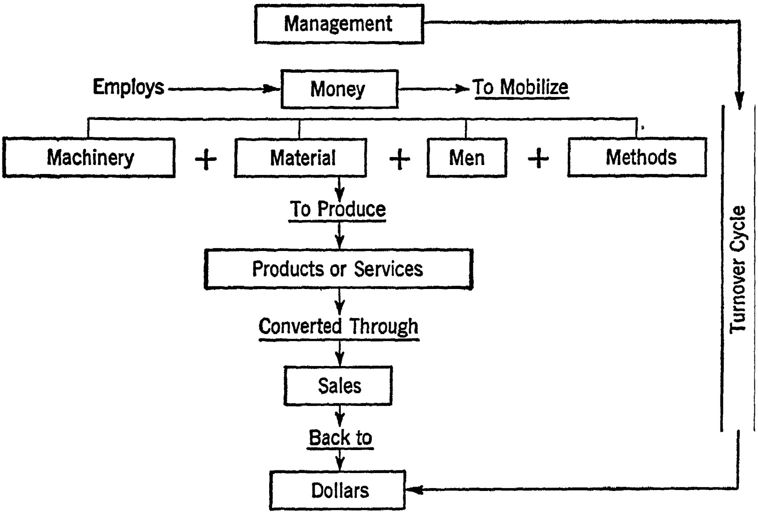

Illustration A. The M's of business.

the M's of business to conversion of materials into salable products, to convert product sales through receivables to cash available for more material to repeat the process, is *turnover.* Thus *turnover* and *time,* in the field of operating management, are synonymous.

Since business objectives can best be expressed in numbers, that is, dollar-and-cents proportions, we are concerned with evaluating the kinds of time influences in today's business values which are used in the projection of business decisions for the future. It is this regard for *time* influence which is the essence of control of the profit path and a determinant of the breakeven point.

Management Philosophy. Those who bear the charge of responsibility must operate with some basic philosophy which justifies their right to make decisions and give orders. A philosophy of management which reflects an appreciation of the influence of *time* as well as responsibility for and to the physical M's of the business would include these principles and methods:

1. A desire and ability to delegate authority, to fix and measure responsibility with definition of the delegation, and to live within

one's definitions without undue passing over and around the individuals assigned.

2. A knowledge of the structure of one's breakeven-point objectives buttressed with the realization that a breakeven-point expression does not solve the management problem but merely crystallizes the problem. Breakeven points actually realized reflect the quality of management as a mirror reflects one's face.
3. A continuous concern with costs even when there is no apparent need. No cost is too small to be worth saving.
4. Evaluation of what one can afford for overhead by comparison with that of a low-margin operation on the theory that today's profits are abnormally high. Be sure, however, that costs are similarly classified.
5. Continuous analysis and control of the business on the basis of profits realized rather than in terms of sales volume; remember, however, that business progress is always relative and that your share of the available business is your quick check.
6. Be willing to share the results of hard work and extra effort with your employees.
7. Maintain a cash position which will keep all employed capital working for you and the owners instead of working unduly for someone else.
8. Educate and develop future management by evaluating cases and experience as a basis for future action rather than depending upon aimless trial and error.
9. Remember that the world is changing and daily becoming more dynamic. The impact of change and its effect upon turnover of managed values requires more "action-packed" management. Management must always be of a mind to challenge habit by seeking a "better way" to face unpleasant facts and to take planned action.
10. Remember to apply a little of the Bible to daily contacts and action.

Conclusion. Over and above a knowledge of the subject matter of the business product or service, a competent management must have both an understanding of what constitutes management responsibility and a basic philosophy with which continuously to appraise management action. Self-criticism and appraisal can forestall external criticism, particularly the criticism of those primarily interested in providing a substitute for, or destroying, our capitalistic system.

To improve the techniques of management, objectives must be not only clearly understood by but also clearly transmitted to those who must help to realize those objectives. Clear transmission of objectives will be best accomplished if they are reduced to numbers and proportions, that is, to dollars and cents. But any statement in terms of value will lack clarity if the statement of aims and projection to futures do not reflect proportions of *time* as well as of sheer volume. Our further study of improved management technique will be guided and colored by recognition of the jagged segments of time and their influence.

CHAPTER 2

WHAT MANAGEMENT MANAGES

Introduction. As an enterprise develops from its very beginnings, management also expands. From a single man with all-seeing eyes and great ears there develops the natural segregation among individuals of the producing, selling, and administrative functions. Organizational structures arise to support broadening and more complex responsibilities in acknowledgment of the fact that one man can no longer do everything with respect to running but a single function, let alone the far reaches of the budding industrial colossus. Unfortunately, organization structure often outstrips in its growth the means of coordinating and summarizing the results of the many parts. The control phase of management tends to develop much more slowly and may remain ineffective long after the enterprise has reached a certain maturity in its purely technical phases.

If ever there has been a period of spectacular growth and sharply increasing need for control techniques, it is the business period since the Second World War. By the mid-1950s the former $200 000-a-year company had attained more than 1 million dollars of annual billing and often had swept up to 3 or 4 million. The prewar 15-million-dollar company was knocking on the door of the 100-million-dollar club, a volume level considered to be the mark of an industrial giant in yesterdays as recent as the 1930s. The "small" have grown "big," and the "large" have truly become "giants."

The Values Entrusted to Management. In sheer numbers, the responsibilities entrusted to the group of men known as "management" beggar the imagination. In 1953, managements of industrial companies employed some 25 billion dollars of cash and securities alone in their operations. Offsetting this fabulous figure were 15 billion dollars of income-tax accruals, leaving but

10 billion dollars of equivalent free cash. For meeting payrolls and paying for materials and supplies, this free cash allowed little margin for error inasmuch as it represented but 12 days' business at going rates of product billings.

Available for direct replenishment of cash were 19 billion dollars in receivables, or about 23 days of sales values at the going rate. Normally in healthy relationships, managers are fully aware of how a tie-up in receivables can quickly grow in relation to sales rates in the face of a general tightening of money.

Collectively, industrial inventories in excess of 40 billion dollars matched 48 days of average billing rate and were turning over at rate of something under five times annually. Were the turnover rate figured in relation to cost dollars instead of selling values, it stood at three times annually. Taking into account payables and currently accrued obligations, the net working capital of American industry was approximately 55 billion dollars, equal to 66 days of sales. More than 70 per cent of this working capital, on the average, was invested in inventory, but some industries and some companies had invested in inventory an amount greater than their net working capital. Needless to say, such conditions called for great caution and were probably cause for great uneasiness among management men.

Beyond working capital, there was invested some 75 billion dollars in plant and equipment. The bricks, mortar, and concrete to house equipment with which people could fashion a product, protect it, display it for sale, and service the needs of users were not paid for out of the output of that single year. Most of the 75 billion dollars must be recovered in tomorrow's costs, on sales of products for which the desire or need has not been created, on sales of goods which may not yet have been designed. In plant does future planning find its most tangible expression, and in plant are often the greatest risks. Yet management adds to its long-term control problems and gambles its faith in its future plans by investing still another 10 billion dollars a year in plant, even though "accelerated" depreciation promises recovery of but half the outlay in the following year.

With all these values at work, industry produced profits before taxes of 22.5 billion dollars, of which 13 billion were due the Federal government as income taxes. The remaining 9½ billion, less than 5 per cent of the values produced, is available for owners' capital compensation, new plant, and the creation of new jobs for more people. Despite this relatively small margin, management has applied in each of recent years an average of 7 billion dollars of these profits, over and above depreciation allowed in costs, to new and added plant to create more jobs to produce more goods for more people.

Growth and Diversification of Decision Authority. A gradual reshaping and restatement of the authority of the line organization has come with the rapid growth of industry. Specialized functional staff groups are being used more widely and have been clothed with new shadings of managerial responsibility and authority. These groups are obligated to consult, guide, and even control specialized and technical functions for and with those on whom the primary line responsibility rests.

As this growth evolution unfolded, management stumbled and groped in its efforts to measure not only the results of individuals but also the results of the jointly made basic decisions. In any operating area the brilliance of the complex whole more and more needs almost prismatic analysis to separate the influences and shadings of influences.

Management must reckon not only with the composition and shading of influences but also with the jagged segments of *time* and *timing* of the influences. Though one can hold that after all we need but examine decisions to spend money, that simplification operates with varying timing. The decision may be for but a single day's duration (as engaging a consultant to inspect a specialized problem), for a year (as with an insurance or labor contract), or for as much as forty years (as with the decision to build of concrete instead of frame and siding). Or the decision may involve indefinite times as with a decision to alter standards of credit, the effect of which may or may not be definitely measurable.

In coping with time, the management process is a continuous struggle to maintain present balance and to plan future balance of quality and quantity at an acceptable cost with a satisfactory rate of turnover. We use yesterday's facts to interpret today's results and plan for a better tomorrow.

For example, the classes of values entrusted to and employed by management each have their own time characteristics and turnover rates.

What Management Manages	*Types of Time Cycle*
Cash: $25 000 000 000	Can we meet this week's payroll and pay invoices now due? Have we provided for next income-tax payment out of cash coming in? Notes due? Must we borrow? When?
Accounts receivable: $19 000 000 000	What is our collection rate? What happens if it slows to 30 days? 40 days?
Inventory: $40 000 000 000	Balanced for production today? This week? Next month? Purchases flowing or coming by fits and starts? Is obsolescence creeping in with slower turnover? Will it be worth what it cost at inventory date?
Plant and equipment: $75 000 000 000	How long for the new machine to pay out? 1 year? 5 years? Must we have it to stay in business regardless of pay-out time? How soon can we get the new plant into production? What are starting costs and how long will they last? Will depreciation on today's decision be a drag on tomorrow's cost?

These are but a few of the types of timing question management wants answered. Such problems must be measured and interpreted, and planned action taken, with all the gears of the business machine in mesh. All of them involve *time* as well as shadings of influence and diversity of sources of influence in management decision.

Conclusion. The sheer size and complexity of what management manages are apparent from the diversity of *time* influences alone. Further complicating its problem of control is the diversity of influences established by management itself in its struggle to achieve growth. And the justification for the existence of any management is that it does manage.

Therefore we hold that the tools for control must go beyond mere figures if they are to serve the needs of management. The profound influence of *time* and *timing* must be reflected in their construction. And in their detail, they must permit isolation of specific decision and measurement of individual and functional performance. We now turn to the kind of control measurements used by managements generally in order to contrast the kind of control management really needs.

CHAPTER 3

MEASURING WHAT MANAGEMENT MANAGES

Introduction. The minimum statistical summaries of business operations are the *balance sheet* and the *statement of profit and loss.* Years of precedent have convinced most managements that these two statements, and certain elaborations of their details, are satisfactory and complete measures of results.

These basic statements also appear in the reports of independent auditors as a means of crystallizing their findings. Interim internal statements usually mimic the finality and seeming completeness of the independent auditor's presentation. There may be some slight differences of arrangement to suit the taste of the company's own accountants, or that of a senior executive. Beyond the simple statement of condition and summarization of "results," there may be this period–last period, this year–last year comparisons as if the fact of differences were the sole consideration. On the other hand, management is seeking to produce changes, and there should be differences. Management needs more aid than such blindfolding statements. Why does the usual style of accounting presentation fall short of the needs of a dynamic management?

What Is Accounting? Accounting is an exacting science. Originally devised to enable a steward to report to a sometimes unbusinesslike owner whether the money values "coming into here" exceeded those "gone away from here," its rules and practices sometimes becloud even that simple fact. The casual user of the accounting reports and his protection are of more concern than the manager. To this protective function accounting owes its man-in-the-street prestige. The banker who lends, the investor concerned with the safety and value of his investment, the customer interested in resources and responsibility, and the creditor accepting a general promise to pay—all rely on the statement of condition set forth in the balance sheet.

The profit and loss statement may or may not be certified by the independent accountant who certifies to the balance sheet. It is supposed to summarize the operating results for a definite period and, like the balance sheet, furnishes certain assurances to the investor but does not explain the quality of the results that it reports. At best, the two statements consistently prepared from period to period do permit certain broad generalizations and some basis for appraisal.

Accounting Is Static. The end result is given in an inflexible report. All that happened during the stated period of time is presented as if it all happened instantaneously. Time and volume within the accounting period are inextricably mixed. This is not a condemnation of accounting; after a fashion, it is protective. At stated intervals, its rigid, condensed, static, and formal presentations give an opportunity to appraise a business and its management in rough proportions.

There is little, however, concerning the *why* of results; the sole basis for comparison is the past. Though the time *periods* of the statements may be uniform, there is nothing concerning the *timing* within the periods. Buried within the details so summarized lie the statistics of management.

The very process of accounting debit and credit emphasizes the statement of condition at the expense of time. It is more important that all facts be represented to finality than to report trend and direction. The rigid-audit trial-balance concept infiltrates interim accounting, carries over into control of costs, and degenerates into accounting for accounting's sake rather than for managerial control. To evaluate inventory often requires weeks; a vendor bill for $400 not received until the 7th of the following month may be allowed to delay thousands of dollars of significant trend-of-costs information.

Perhaps the real trouble with accounting is the accountants. The product of all the accounting effort for which business pays goodly sums need not be so far a cry from the needs of the business manager, who is daily coping with balance of quality, quantity, and costs occurring in jagged time relationships.

How Static Accounting Distorts Facts. The typical profit and loss statement is a hindsight summary of the operating results for a definite period of time. It is usual to report the dollar values and percentage relationships as shown in Table I.

TABLE I. TYPICAL SUMMARY OF OPERATIONS

Particulars	Current year	Per dollar of sales
Net sales billed..............	$1 000 000	$1.00
Operating costs..............	700 000	0.70
Profit from operations........	$ 300 000	$0.30
Selling and administration.....	200 000	0.20
Profit before income taxes.....	$ 100 000	$0.10

So the business realized a pretax profit of 10 per cent on the sales dollar! Is this good? Was the management efficient? Is there any reason to suppose that 10 per cent should be earned on sales of next year? And what happened last year? Factually, the 10 per cent profit assures us of nothing; it is in no way an indication of good or of bad performance in this or in any other year. Furthermore, the statement is misleading.

If these income and cost figures were plotted, the results would look like Chart 1. This chart shows just what the profit and loss statement claims—that the cost units are 90 cents per dollar of sales. The cost and sales lines never cross; there is no way to find a breakeven point. The inference is plain, and there is no way to prove the contrary: 10 cents is the profit—the same on the first dollar of sales as on the thousandth, the millionth dollar of output.

All successful businessmen know this cannot be true. They may not always know *why*, but they do know that for some unknown distance along the output scale, there are losses, not profits. Therefore, the profit and loss statement is lacking and misleading in its failure to suggest the fact of a breakeven point where the cost line crosses the income line. There is no clue to management's basic problem of controlling itself and the enterprise for which it is responsible.

At best, such a statement of operations is a static cross section of *what* happened. It does not tell *why*, or *how*.

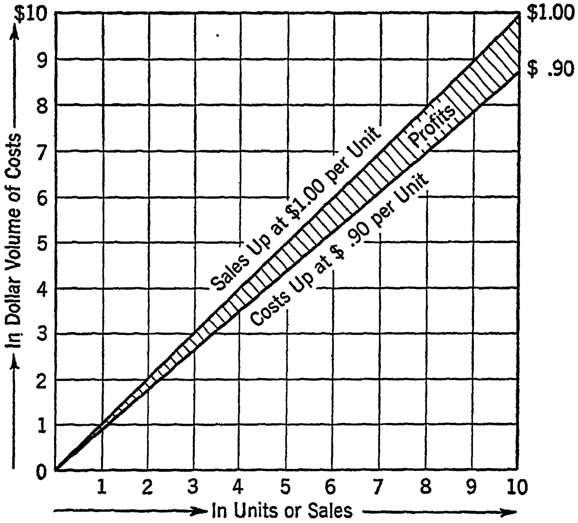

Chart 1. Sales and costs.

Figures for Accounting's Sake. It becomes more clear why it is so difficult to express management decisions and directives in number values and proportions, why key supervision fails to envision management objectives and how they are to fit their own operations into the general plan. The drive for downward adjustment of spending rates must always come from the top, and the check on upward spending rates must always come from the top so long as the medium of management expression continues to be static accounting ratios.

Most of the figure data which should guide adjustment maneuvers are kept for the sake of the accounting records and not as a means of conveying the wishes of management and measuring deviations from management plans. This lack of base-line measurement blocks and delays basic decisions and their understanding. Most necessary action could be as precise as "yes" or "no" were the facts properly presented.

These failures are characteristic of the mass of accounting figures compiled ostensibly for control purposes in the average enterprise.

1. Accounting figures are prepared primarily for the accounting function of issuing a balance sheet and profit and loss state-

ment, costing sales, and valuing inventory. They are arranged to support these statements, which in themselves are not sufficiently detailed to expose the requirements of running management.

2. Accounting figures tend to disregard organizational structures, so that it is difficult to ferret out the personal effectiveness of individuals who make decisions.

3. *Lag* [1] eats up valuable decision time. The time lag of accounting and reporting delays correction of dangerous weaknesses resulting in serious profit losses. A study of companies who had financial difficulty between 1929 and 1932 shows that over 50 per cent of them experienced trouble not primarily because their volume fell too much, but mainly because they were too far behind in valuing, interpreting, and correcting for adverse conditions.

4. Interim accounting figures lack proportion. Their significance is often a matter for speculation. When the chips are down and the "heat" is on an individual or a group of individuals, it is too easy to get elusive answers to pressing questions. You cannot apply force unless you can "button down" the facts.

5. Accounting terms used in presentation may not be clearly descriptive or may be too inclusive so that significance for use in close managing may be blurred or dissipated.

6. Because of estimates and sloppy accrual systems, conscientious individual managers become frustrated when they cannot reconcile accurate personal records of expenses with an estimated yet "recognized" official accounting report.

The fifth problem needs to be solved first, for how can a system of controls be developed to support the decisions of management unless terms can be readily grasped and interpreted by management?

In order to get the most out of accounting figures as presented, the following requirements should be the goal of the accounting and cost departments, and management must see that they are accomplished in fact, not in theory. These are:

1. Honest figures. "Honest" is just what we mean. The fountainhead of figures from which business decisions must be made

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[1] *Lag* is discussed in detail in Chap. 7.

must be factual, not estimates or assumptions based upon outdated studies or still other suppositions.

2. Segregation of the elements of cost into their components of organizational structure rather than trite accounting subdivisions. Each organizational segment has a very different aspect of *time* relationship and control technique or the organizational segregation would not have been made in the first place.
3. Breakdown of the elements of cost into their *time* components for control when and where money is spent.
4. Adequate base-line standards of operation which coordinate, add up, and "make sense" as an expression of the basic plan of operation.
5. Flow accounting and costing.
6. Organized and coordinated control reports and control forecasts tied into accounting proof without duplicated effort.

Conclusion. You cannot really know the facts until you shake away the rituals which now exist in figure gathering and examine without reservation your own procedures in the light of the above requirements. Unless your answers are positive, clear, and concise, much work remains ahead of you before you can assure yourself that you are managing with facts.

It is easy to understand why Owen D. Young, long Chairman of the Board of General Electric Company, said, "The commonest article of commerce is misinformation about fundamental things."

Clearing the welter of accounting misinformation about the money facts of any business requires a progressive management to indulge in new thinking. First, there is the realization that *time* and *value* together make business facts. Value alone is misleading. This step forces one into an understanding of the *breakeven concept.*

CHAPTER 4

THE BREAKEVEN CONCEPT

Introduction. An inquiring reporter with the knack of getting to the heart of a subject would find that those who manage business affairs and who are responsible either for guiding profit performance or for measuring it know very little about what breakevens are, why they are what they are, or what to do about them when they show eccentric characteristics.

Do You Know Your Breakeven Point? It is true that when the question is first put to management men they are prone to say, "Of course I know what breakevens are. They are the place where profits turn to losses or losses to profits, depending upon whether you are going up or down." It is surprising how many first-class, high-ranking executives shrug off the whole problem with this type of comment.

A *Business Week* magazine article made three important points: "Most management men talk about breakeven points, but they often mean a lot of different things." "A few companies really figure the points closely—and swear by the results." "Most companies know—or guess—that their breakeven points have risen little in terms of capacity."[1] These statements agree with our findings. The 19th hole on the breakeven point is played in about the same vein as on the golf course. The poorer the performance, the louder the excuses.

Breakevens and Capacity. It is true that the breakeven point is that point of capacity at which operations pass from profits to losses or vice versa. The only trouble with this concept is that this point in terms of either capacity or income is not rigid or static. It changes with every decision of management. It changes when selling prices change and when operating efficiency rises or falls. It changes as the relationship between product lines varies even for short periods of time. These and many other reasons cause a breakeven point to move in a definable orbit. Unless the path of this orbit can be measured, conclusions reached about breakevens may be as dangerous as a bottle marked "Poison" if not used correctly.

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[1] *Business Week*, Dec. 13, 1952, p. 158.

Resistance to Breakeven Control. Because the postwar years were so lucrative that management energy was concentrated on the problem of keeping up production, many executives have built up "straw men" of resistance in their minds against the breakeven concepts without thinking of the consequences.

Most management men have adopted the term "breakeven" as a part of their vernacular and the word bobs up everywhere. Yet most of those in authority who toss the word around in conversation have little concrete knowledge about the structure of a breakeven point, its habits, or its characteristics, and know even less how to harness the breakeven concept in guiding their operations. To offset these shortcomings in advanced management thinking, alibis and excuses have developed.

The major excuses run about as follows: "Why worry about the breakeven point today? We will get it down when we have to." Or, "It will work all right for others perhaps, but it just won't work in our company," or, "It's all theory and not very practical."

These are but a few of the hundreds of defensive comments used daily in explaining all types of performance to all kinds of people who are interested in these problems. Were we to attempt cataloguing the variations and ramifications of the statements above, they would range from the ridiculous to the sublime. Many of them, if put together in proper sequence, would be as interesting and entertaining as the proverbial three-ring circus.

Today's Breakeven Too Easy to Attain. To answer broadly, at this time, the foregoing comments, which will be debunked in detail in later chapters, the following observations are appropriate. Why worry about the breakeven point today if we can get it down when we have to? We did not bring it down from 1929 to 1932, when it was a fight for survival. To be sure, that was over 20 years ago, and we have learned much in management techniques since then. Nor did many industries demonstrate ability to hold on to their breakeven-point positions in the 1937–

1938 recession. And breakeven-point control was widely lacking in 1949–1950. The truth is that each faltering and falling-off business, however slight the hiatus, again demonstrates the need for better control mechanisms to protect against the "close-haul" years.

The average company today will find it difficult even to maintain its existing breakeven point when volume falls off, let alone attempt to reduce or improve its breakeven picture. Inflexible labor contracts, sheer size and diversity, multiplicity of operating locations, and unstreamlined methods of selling are just a few of the present conditions leading to less cost flexibility and greater difficulty of control.

Companies that have run contra to the pattern of constant growth which has been so typical of industry in recent years are leaving monuments to attest to the fact that breakeven reduction is not a "sleight-of-hand" process. It requires hard work to build techniques based on dynamic and forceful controls, controls which tell why profits vary as well as what profits are.

"Breakeven Concepts Won't Work for Our Company." Holding that breakevens may work all right in other companies but not in your own runs counter to experience in retailing, service, and manufacturing, from capital goods to soft goods, from technical to highly competitive lines. Whether it be the airline industry with its peculiarities (including people who think you can be good only if you are a flyer) or a chain of lumber yards or a chemical plant, breakeven concepts will work, provided the idea has executive support, the controls are honestly built, and the findings honestly followed. Of course they will not work for you if you do not want them to.

Are Breakevens Theory? Some say breakevens are all theory. If you think breakevens are simply theoretical, it is because you are theoretical. The breakeven point does not harness you. It records what you harness. If it appears to be unrealistic, if it presents conditions which you do not believe, that is not the fault of the breakeven point. Like the thermometer which measures the temperature in your office or home, it measures facts. If the thermometer tells you it is cold, that is not the fault of the thermometer but of the temperature being measured.

Breakevens are the mirror of your business, nothing less, nothing more. Their application and use will tell you how your business looks and will help you decide whether it is "time for a change."

Delving deeply into the objections to breakeven-point analysis and control, one finds but few real bases for opposing application of this scientific and sensitive aid to business operation. Plain lack of understanding can be cured, but more disturbing are the resistances rooted in downright indifference and in personal ego.

Indifference arises in prosperous periods during which profits are easy to come by. Simple evolution will jar lethargy of this kind because it is inevitable that the going will be more difficult in some years than in others. In the meantime both employees and owners suffer. Personal ego objections are more difficult to meet. In such cases the chief executive is proud of his ability, likes to run by the seat of his pants, and despite protestations to the contrary, enjoys the role of local god and crystal-ball gazer extraordinary. He does not want science in management if he will lose the zest of his mysterious maneuvering. Even such a manager will find breakeven control useful in lightening his load. Apart from the better performance his executives will register, his own life will be more free of ulcers, hardening of the arteries, and frightening heart disturbances.

The *Business Week* article cited earlier gives a clue which is worthy of note: "Relatively few companies make explicit operational use of breakeven points, or even figure them very closely. The companies that do use breakeven points frequently build intricate systems out of them, and swear by their usefulness."

To refresh our thinking of what a breakeven point is, how it is determined, and how it gives dynamics to static information, an illustration from a section of the history of Caterpillar Tractor will be helpful.

Caterpillar Tractor Company Breakeven Chart. For illustration, a simple breakeven chart of the Caterpillar Tractor Company is shown for the most recent years (Chart 2).

The base scale of the chart is the reason for incurring cost—therefore we have plotted the annual net sales in millions of dollars horizontally. The vertical scale is assigned to the value to be compared with the reason for incurring cost. Since we are concerned with the behavior of costs in relation to sales income,

TABLE II. CATERPILLAR TRACTOR COMPANY SALES AND COSTS 1946–1953

Year	Net sales	Adjusted costs *	Year	Net sales	Adjusted costs *
1946	$128 437	$126 069	1950	$337 285	$276 727
1947	189 120	172 816	1951	393 756	356 903
1948	218 037	193 686	1952	477 600	406 106
1949	254 872	228 482	1953	433 800	371 465

* Depreciation for all years restated to that used in 1951 to eliminate the effect of changed plant capacity and accelerated amortization. Income taxes are not included in costs.

the vertical scale is assigned to annual costs (before income taxes) in millions of dollars.

It is axiomatic that "breakeven" means balance of sales income with cost outgo. Therefore we draw a "sales" line (really a line of 100 per cent correlation between costs and sales income) from the zero point at the left to Point B on the chart. At that point the line indicates, according to our scales, that there is a "breakeven" condition if sales and costs are both 500 million dollars; and the breakeven condition will be shown if costs fall on any point of the broken "sales" line down to zero.

Then we take the adjusted costs from Table II and plot the costs for each year, measuring up on the cost scale, and recording its point directly over the sales value plotted for that year along the base line. It is apparent that in the years 1946, 1947, 1948, and 1950 cost and sales relationships were such that a straight line could be drawn through them. But we are dealing with the record through 1953. A straight line drawn through the 1949 and 1953 points falls through an approximate average of the 1950 and 1951 points. Furthermore such a line closely imitates the slope of the 1946–1948 points. Therefore, for illustrative purposes it is a fair assumption that this higher line, marked "costs of output" on the chart, is fairly representative of the more recent cost-volume-income relationships realized by the Caterpillar management.

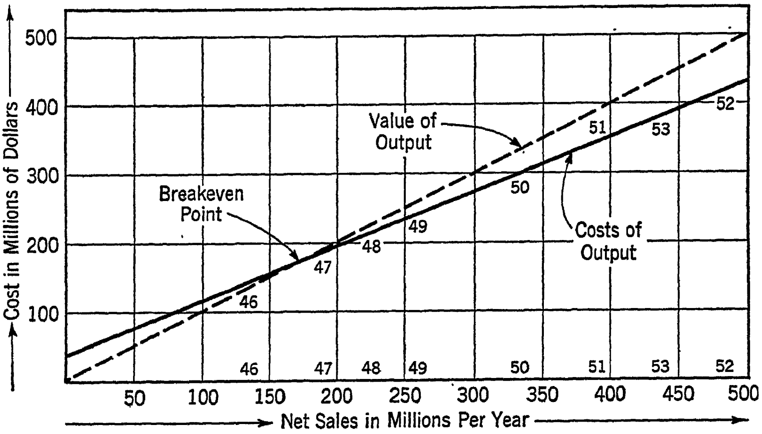


Chart 2. Breakeven chart, Caterpillar Tractor Company.

It is evident that the slopes of the sales line and of the cost line are substantially different. Running the cost line down to the zero net-sales axis (extreme left) we find that this "cost pattern" indicates a substantial remainder of cost even though sales income were zero. This remainder is the standby or constant relationship common to certain kinds of costs in every business. There would be no such thing as a breakeven point (point of crossover between the cost and sales lines) unless this were true. As was pointed out in the previous chapter, accounting statements do not suggest the presence of this kind of costs nor afford any means of estimating the relative importance of the variable and standby costs.

We are not concerned here with the specific value of Caterpillar's breakeven point. Rather, using data which can be checked with public sources, we seek only to demonstrate that the slopes of the cost and sales lines for Caterpillar, and, indeed, for every company no matter what the nature of its business, will disclose two kinds of costs.

As we have drawn the line, the cost line rises from the standby constant at a rate of approximately $79 for each $100 of sales. This was the rate at which Caterpillar added costs (as sales volume rose from some 228 million dollars in 1949 to 406 million dollars in 1952), a little more or a little less, year by year. Over the term of years as the adjusted years are plotted, this could be said to represent Caterpillar's quality of control on the upside. But should sales volume decline, we could not attribute the same quality of control *unless Caterpillar also removes $79 of cost for each $100 of sales decline.* That kind of cost control is necessary to hold the breakeven point at the indicated 150 million dollars of sales.

To control costs and their resultant profits, the problem of management is one of understanding how the two elements—standby and variable time factors—are affected by specific decisions. So long as there is no means of separating them, as in the conventional accounting statement, management cannot but confuse its people and confuse itself in its efforts to "do something about the breakeven point."

Why Fly Blind? Fly blind if you are happy, but if you prefer instruments to control your course, they must be used correctly and with sufficient knowledge to bring you out of the overcast and land you safely at some selected objective. The breakeven chart is an excellent instrument panel for your guidance in controlling your business. The ten salient points of the breakeven-point chart are so many gauges for checking out your management decisions. Study Chart 3 carefully. Let your imagination take hold. With good understanding of these points you can appraise your own breakeven point and can interpret the signals for important management action. The ten points of significance in a breakeven chart are:

1. The breakeven point itself
2. The profit path above the breakeven point as an indication of inherent profitability
3. The standby cost relationship to other costs and sales values at the breakeven point and at other capacity levels
4. The breakeven point as a percentage of normal output capacity—the margin-of-safety index
5. Point of maximum output as measured by existing plant or organization capacity, or point at which diminishing returns appear as a higher rate of variable costs because of major productive inefficiencies
6. Variable cost rate, an approximation of true "direct" or out-of-pocket costs
7. Selling price per unit

8. Relationship of variable and standby costs at any level of activity
9. Tie-in with profit and loss statement as a test of validity
10. Competitive comparison with other companies (not shown on Chart 2; discussed in Section 2)

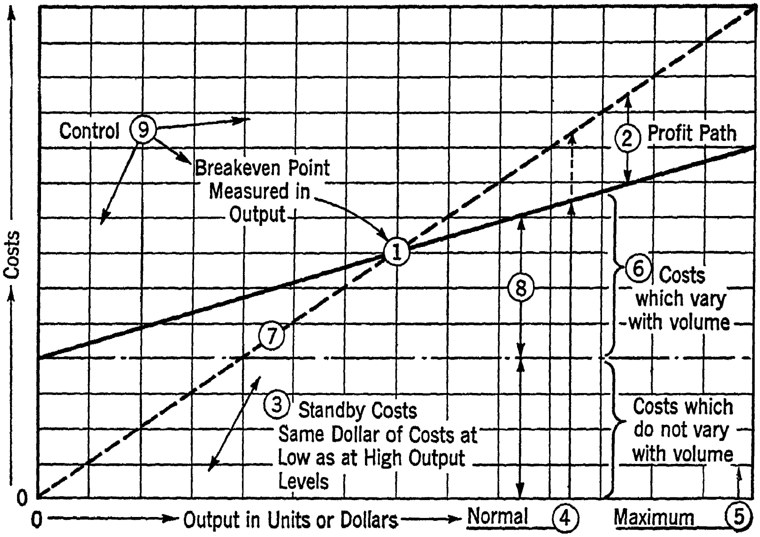


Chart 3. The important points of breakeven analysis.

Conclusion. As with any control-instrument panel, much is needed behind the breakeven chart to make it work and to make it the reliable, ever-ready management aid that it can and should be. Take warning: we have but started on the road to dynamic business control and costing; there is much hard work ahead.

There must, however, be a basic understanding and acceptance of the breakeven concept. Remember that you are trying to bring order out of the chaos of the conflicting *time* effects of different kinds of business cost. Unproved promises and "guesstimates" will be more harmful than helpful. Your breakeven chart must be thoroughly supported with detailed cost planning and structuring, carrying the concept down into each phase, department, and account within your business.

CHAPTER 5

BREAKEVEN ARITHMETIC

Introduction. *Segments of Breakeven Thinking.* Since some costs are *fixed* (regulated by time and decision, not by volume), the rest of the costs are less than the total, and surely less than the unit value of the sales, which is *why* there is a *breakeven point!* A breakeven point does not start with the first unit because all costs do not vary with units of output, and because a profit cannot be made until the costs which do not vary with units are recovered.

In Chapter 3 it was stated that 10 per cent may be the apparent average profit rate but cannot be the rate on any particular sale as the profit and loss statement would indicate. Let us explore this idea more fully since this is where accounting is taken too literally. It is as simple as this: accounting says:

Net sales........................	$10 000
Costs...........................	9 000
Profit...........................	$ 1 000
% profit........................	10%

But, according to breakeven arithmetic it will be found that costs behaved something like this:

Net sales........................	$10 000
Variable costs, 80%.............	8 000
Profits before fixed costs *........	$ 2 000
Profit pickup on each $ of sales...	20% †

---

* Hereafter referred to as *standby* or *time* cost (see reasons stated on p. 28).

† Before profits accrue however, nonvariables (standby costs) must be recovered.

Standby and Variable Components of Breakeven Determination. The general terminology commonly used to support the average breakeven point is that costs are "fixed" and "variable." They are "fixed" because they do not vary readily with volume changes, and "variable" because they do. In shading these two broad demarcations, economists and accountants as well as management often attempt to classify costs as "fixed," "semivariable," and "variable."

Whether a particular cost is correctly assigned to one of these categories depends upon its natural relationship and the ability and willingness of management to control it as the rate of operating activity rises and falls.

While these terms may help to explain what we are getting at in supporting a breakeven point, they are neither adequate nor satisfactory. In the first chapter we placed great emphasis on the importance of *turnover* in management's thinking and in management's problems.

Fixed or Standby Is Turnover of Time. Turnover was defined as "jagged segments of *time*" varying from a day to a week or even to months, years, or even a decade in certain types of costs. While the costs resulting from these longer *time* cycles seem to be "fixed" when viewed at the moment, they are not really fixed. They can be controlled with time. Consequently, the word "fixed" is psychologically unfit to explain the *time* concept of costs which vary with *time* but do not vary with volume. Because a cost may be temporarily fixed in futures of *time* it is not fixed in the problems of managing. Thus, a cost of *time* which may be affecting a profit relationship can still be controlled by management. The function of control is simply changed to a time decision instead of a volume decision.

Operation of this underlying fact upsets the oversimplification of the time-honored accounting formula: sales income − costs = profit or loss. Because costs do include a constant element, and because they do pass through a crossover breakeven point in every business, the formula should be correctly and dynamically stated:

Profit or losses = sales income − (standby costs + variable costs)

What Are Standby Costs? Standby costs are those costs which, because of organization structure, style of operation, capital availability, methods of selling, size of productive capacity, and stored-up knowledge of key individuals, cannot be added or dropped at will through wide ranges of activity rate fluctuation. Standby costs arise by both long-term decision and management tolerance, and a change as an abrupt step can be accomplished only with major long-term decision. Even if the decision is reached, the effect on standby costs will not usually appear immediately. How to determine, justify, and control the standby element of the breakeven point is held for later discussion. It will suffice here to point out that costs commonly having the inflexible standby characteristic include depreciation, property insurance and taxes, minimum-fee service contracts, costs of keeping open low-volume sales offices and warehouses, and the like.

What Are Variable Costs? Variable costs are those costs which by their inherent nature and by the basic reason for spending the money should respond in direct proportion to fluctuations in the volume of activity. Whether such response actually occurs depends upon adequate knowledge, visual controls, and forceful directives. They may be thought of as costs of *doing* business as opposed to standby costs, which are the costs of being *in* business. The prime costs, standard direct material and labor and straight-line commission rates on sales, are clear examples of variable costs which respond to volume of activity. More adequate discussion is assigned to a later chapter.

It is important that the reader not assume that within each department or within each account classification the costs are always wholly variable or wholly standby. There is a complementary relationship between standby and variable costs which reflects the operation of the jagged segments of *time* influence in many of the cost and accounting detailed segregations. Apart from inherently conflicting natures, many of the cost details will be affected by failure of managerial control. Determination of the values of two kinds of time costs in such cases often becomes quite involved.

One may believe, for example, that inspection is necessary only when there is production, and that its cost should vary closely in ratio with productive output. Technical advances in inspection technique, however, have given rise to statistical specialists and inspection supervisors. Some part of this reservoir of know-how and supervisory ability needed so long as the enterprise is on a going-concern basis would appear as standby in the cost structure.

A favorite accounting device is to assume that payroll taxes are "fixed" costs. Pure logic tells us that there must be a heavy proportion of variability within this category because direct labor itself is largely variable. And so it goes. There is always a potential mixture of standby and variable elements within every account classification. The costs of operating the family automobile demonstrate this mixture as well as a business like the Caterpillar Tractor Company.

To determine the difference between variable and standby costs and to separate them for use in dynamic accounting require scientific analysis. To accomplish this several ways are used, but the most common and direct way is the "scatter-chart" method.

Let us apply the principles of scatter-chart plotting as a means of developing our breakeven analysis.

How to Draw a Scatter Chart. There are two prime considerations in appraising any cost trend and developing a breakeven relationship. These are the ordinates of a scatter chart.

1. "Why costs are spent"—illustrated by net sales
2. "What is spent"—cost of producing sales

These considerations are carried forward into making the scatter-chart picture.

Step 1: Determination of What to Plot. What to plot depends upon what one is after. For example, if one is attempting to determine the breakeven point of the Caterpillar Tractor Company, the two important elements of plotting would be net sales by months or years and costs of operations before taxes and interest payments. Using the figures for Caterpillar given in Table II, page 23, proceed to steps 2 and 3 in scatter charting.

Step 2: Plotting These Costs. (*a*) *Base.* The first thing to plot is the base reason for spending money, that is, sales activity. Thus, in Illustration B, step 1, a scale for measuring sales income in millions has been laid out across the base of the chart this way: →

(*b*) *Costs.* The next element to plot is cost to the base, so a scale must be shown along the side this way: ↑

With output this way → and costs this way ↑ the resulting plot

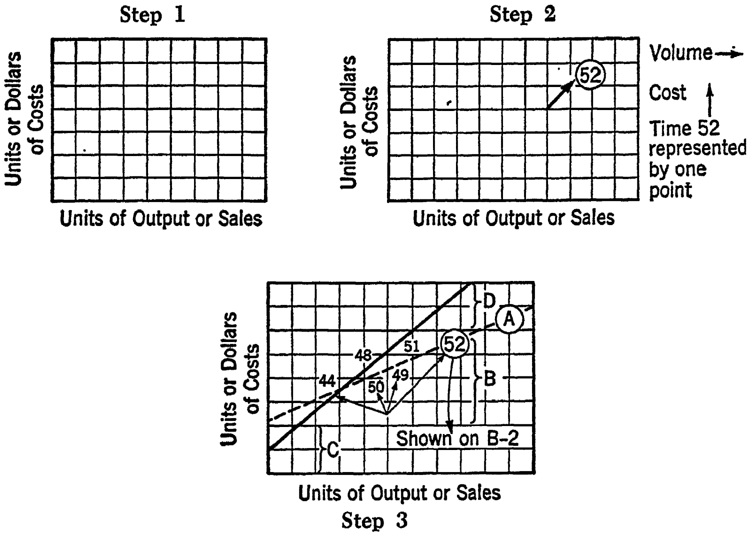


Illustration B. How to plot a scatter chart.

becomes a scatter chart and each point plotted represents a three-dimensional condition, i.e., a point of volume, cost, and time. For the year 1952 with sales measured across the bottom, 9 units of volume on the chart and with the side of the chart measuring costs (5 plus units of cost), the resulting plot for the sales and costs together is recorded by the point 52. This plot looks as shown in Illustration B, step 2.

The scatter chart is completed by plotting all available data for years other than 1952 as shown in Illustration B, step 3.

Step 3: Drawing a Scatter Line. Drawing a line of best fit (marked A on Illustration B, step 3) summarizes the interplay of standby and variable cost factors in the costs of this company. This line can be determined by one of several methods:

1. Mathematically determining the geometric average slope of the points. This is also known as the "theory of least squares," which will be recognized as a tedious method when there are any considerable numbers of points to be calculated.

2. Plotting and joining the arithmetic average of the lowest and highest groups of points. While much faster than the first

method, it shares the difficulty that not all points of plot should be accepted as typical.

3. Using line-of-sight best fit. This method gives the best results because it is faster, allows for consideration of probabilities and shadings of events, gives due weight to consecutive consistency of performance, and gives recognition to the difference between representation of the past and desirable goals for the future. In the case of the Caterpillar breakeven (page 24) the line of best fit was used to determine the cost line and therefore the breakeven point.

The family automobile is a good illustration of building and determining standby and variable relationships through scatter-chart methods.

Illustration of Arithmetic by Cost of Family Car. Suppose in speaking of his family automobile a friend says, "My car costs 8 cents a mile to operate"; he expresses *static* or accounting costs. This statement reflects static cost thinking because the expression is for a given period of time (one year) and for a given number of miles, i.e., 750 miles per month, 9 000 miles per year. The cost is of *no value* in cost comparisons with other years, or other mileages. It pertains to but one set of conditions already accomplished.

Analyzing the data from these typical static methods, he would determine his average costs by dividing $715 by 8 790 miles. This gives an average cost of slightly over 8.1 cents per mile for 1953. See Table III.

TABLE III. COST OF OPERATING AUTOMOBILE BY MONTHS

Month	Miles	Cost	Month	Miles	Cost
January......	400	$46	August......	960	$ 67
February.....	320	43	September...	1 200	79
March.......	640	56	October.....	1 080	72
April........	560	54	November...	700	57
May.........	610	54	December...	450	51
June.........	870	65			
July.........	1 000	71		8 790	$715

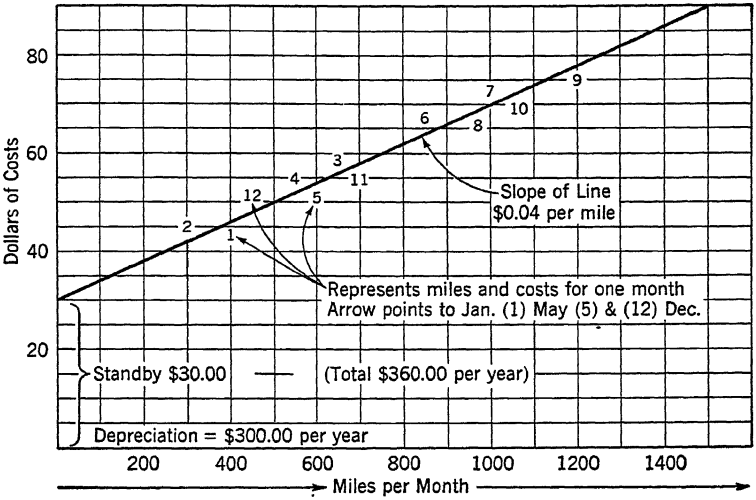


Chart 4. Automobile cost scatter chart.

The chart indicates that the complete breakeven-cost formula for the automobile is 4 cents for every mile run plus $360 a year, regardless of the miles operated, not 7 or 8 cents.

That is neither here nor there at the moment. The illustration is intended to point up the real problem of related costs in expressing a changing value that is warped by changes in *time* and *volume.*

These costs are now dynamic, reflecting jagged segments of time, for there is now a separation between fixed (time) costs and *volume* costs, depending on the way our friend operates his car.

Why do we get these two kinds of costs? Look at the costs themselves; there is the clue. Gasoline, oil, tires, and general repairs—all are created by usage (*volume*) since they depend primarily on *mileage.*

Expenses such as batteries, license fees, insurance, garage, taxes, and depreciation do not depend to any great extent upon mileage. They depend upon *time.* This is why the scatter in Chart 4 produces a standby of $30 a month or $360 a year.

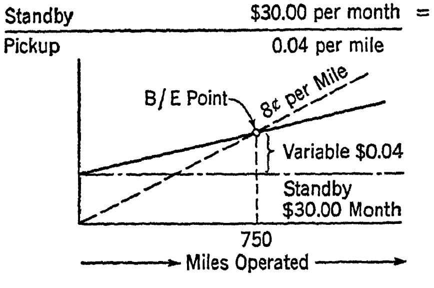
To extend the above to a profit and loss statement, a selling price would be required for the miles costed. To make this a complete picture, assume that each mile is sold for 8 cents and that approximately 91 per cent of the mileage can be billed. This would mean that the billing would cover approximately 8 000 miles at 8 cents a mile. This would produce an income of $640 for the year.

The business of operating the car, then, would show a loss for the year of $75 (sales, $640; costs, $715; loss, $75).

This is the typical static presentation of cost facts after they have happened, based on conditions of volume and performance which are not explained and which cannot be explained from the generalized figures that would show on this simple yet representative profit and loss statement.

Based on the scatter chart just shown, the real car costs work out in arithmetic as follows:

1. Variable gain per mile over $0.04 per mile cost (at 8-cent selling price per mile)	$ 0.04
2. Scheduled standby cost per year	$360.00
3. Miles required to operate to recover $360.00	9 000 miles per year



750 miles per month at $0.08 per mile needed to recover $0.04 variable and $30.00 standby. Then, profit is $0.04 per mile on every mile above 750 in any month.

Chart 5. Automobile breakeven point.

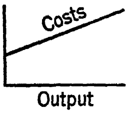
So your friend's statement is "true" but only at 9 000 miles a year; it is not true at any other *mileage!* Hold! He told us something else; he charges his employer 8 cents a mile for business use of the car. Let us do some more figuring and see how your friend can really put breakeven thinking to work.

Now if your friend charges for his car on his expense account at 8 cents per mile one could produce a breakeven point thus: sales (miles charged), $0.08 per mile, less costs (standby $30 per month plus variable $0.04 per mile).

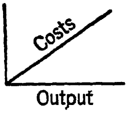
Sales	$0.08 per mile
Variable costs	0.04 per mile
Pickup for profit after recovery of standby costs	$0.04 per mile

Chart 5 showed us that the breakeven point at 8 cents per mile charging rate is 750 miles per month or 9 000 miles a year. Therefore, your friend can operate his car for personal use to the extent of 3 000 miles a year and hold the over-all cost of operating his car to 8 cents a mile. His net cost will not be 8 cents, however; his cost for personal mileage will be but 4 cents a mile, and it will continue to be 4 cents a mile for all miles in excess of 9 000 charged to his employer. That is, each mile in excess of 9 000 charged to the employer pays for a mile of personal use. At total mileage of 15 000 your friend's out-of-pocket cost for 3 000 miles of personal use will be zero, and his total car cost less recovery of 8 cents per mile on his expense account will also be zero. Perhaps you will want to talk things over with your friend and find out what he really meant, or you may want to look over the car allowance of your men using their own cars.

Dynamic Facts with Business Costs. Business costs operate in much the same fashion as the costs of operating an automobile. Among the standby costs which do not change with volume are depreciation, taxes, and the normal wear and tear on buildings and structures due to weathering. Like your experience with an assumed trade-in value for your car, the replacement costs of business assets may be higher than anticipated. In a business there are running costs too. The principal difference lies in the fact that so much of the standby and running costs of a business include employees and the cost of their labor. In any event, we see why business costs operate like this:



instead of this:



But why did the profit and loss statement show a 10 per cent profit in the example back on page 27? One-half of the sales were required to absorb fixed or standby costs, and from then on all the rest of the sales brought in *20 per cent* profit or "pickup." The arithmetic looks like this:

Total sales..........	$10 000
Sales required to break even............	5 000
Sales above the breakeven point	$ 5 000
Profit pickup of 20%...	$ 1 000
Profit % on *this* and *only this* volume....	10%

Consider this also: because 10 per cent profit is considered fair at $10 000 net sales does not mean it is fair at other sales levels. At *higher* sales, the picture would look different (see Table IV-A).

TABLE IV-A. OVER-ALL PROFIT RATIO AT VARIOUS VOLUMES

Net sales..........	$10 000	$15 000	$20 000
Costs:			
Standby........	1 000	1 000	1 000
Variable 80%...:.	8 000	12 000	16 000
Total costs........	$ 9 000	$13 000	$17 000
Profit.............	10%	13%	15%

Conversely, on lesser sales, the profit will be smaller if variable costs are at the same rate as they were at the $10 000 volume. What would happen is shown by the data in Table IV-B.

TABLE IV-B. OVER-ALL PROFIT RATIO AT VARIOUS VOLUMES

Net sales............	$10 000	$7 000	$5 000
Costs:			
Standby..........	1 000	1 000	1 000
Variable 80%......	8 000	5 600	4 000
Total costs..........	$ 9 000	$6 600	$5 000
Profit...............	1 000	400	0
	10%	5.7%	*

* Breakeven point.

The only way to maintain 10 per cent profit at $5 000 net sales is to reduce either the standby or the variable or both. For instance, see Table V-A.

TABLE V-A. COST REDUCTIONS AND PROFITS

	Original cost structure	Reduction of standby	Reduction of variable	Reduction of both standby and variable
Net sales	$10 000	$5 000	$5 000	$5 000
Standby	1 000	500	1 000	800
Variable $0.80	8 000	4 000	3 500	3 700
Total costs	9 000	4 500	4 500	4 500
Profit	1 000	500	500	500
	10%	10%	10%	10%

Reducing the variable rate of costs from $0.80 to $0.70 would mean that each unit of output must be produced for 12 per cent less (70/80).

Do not be confused by the idea that costs will come down automatically because you have had an $0.80 or $0.70 variable rate. They will come down 70 cents, 80 cents, or some part of these amounts only if management specifically reduces them as the volume of output diminishes. Just because they are variable on volume in name does not mean they vary automatically. They should, but they do not (see Table V-B).

TABLE V-B. COST REDUCTIONS AND PROFITS

Net sales	$10 000	$7 500	$5 000
Variable costs	8 000	6 000	4 000
Reduction	.....	2 000	2 000
$ reduction	.....	2 000/2 500	4 000/5 000 *
		80¢	80¢

* Expected reduction just to maintain variable rate and not increase breakeven point.

Now—what happens if the planned cost patterns are not realized? The accounting profit and loss statement is shown in Table V-C.

TABLE V-C. COST REDUCTIONS AND PROFITS

	Planned	Actual
Net sales.....	$10 000	$10 000
Costs........	9 000	9 300
Profit........	1 000	700
% profit	10%	7.0%

By the use of *standby* and *variable* factors, one gets a new look (see Table VI).

TABLE VI. PROFIT VARIATION

	Planned		Actual		Over
Net sales.....		$10 000		$10 000	
Standby.....		1 000		1 100	$100
Variable.....	$0.80 =	8 000	$0.82 =	8 200	200
Profit........		$ 1 000		$ 700	

TABLE VII. PROFIT-VARIATION DETAIL

Department	Standby	Variable
4	$ 40	$ 22
11	10	40
32	30	70
53	20	
69	...	28
73	...	40
	$100	$200

In other words, \$0.82 was spent for each dollar of sales, instead of \$0.80. Details of the costs over the allowance by departments are shown in Table VII.

Thus, it should be clear that to X-ray profits, standby and variable factors are needed, not just *ratios*, and the standby and variable factors must be built for use where the money is spent at the department *doing* level of cost. Only then can variances be traced back to each supervisory responsibility.

To return to the accounting contention, which is a "half truth":

\$10 000 − \$9 000 = \$1 000, or 10%

The whole truth is only a matter of practical refinements. Note:

\$10 000 − (variable) \$8 000 = \$2 000, or 20% variable pickup

(Standby) \$1 000 ÷ \$0.20 = \$5 000, the breakeven point

Profits are 20 cents on every dollar of sales above \$5 000 if actual performance is along the projected profit path.

With this expansion of the same facts, static ratios have now become dynamic and measure a chain of conditions all tied in with one another and reconcilable, moving with volume changes without confusion. To repeat, in chart form these statements are as given in Charts 6 and 6-A.

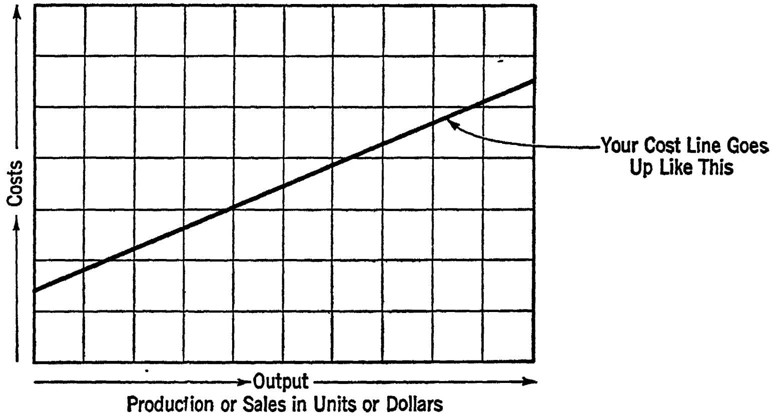


Chart 6. Cost trend line.

NOT
like this, as your
P & L Statement will
make you believe

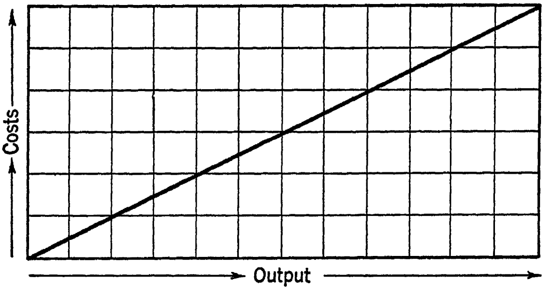
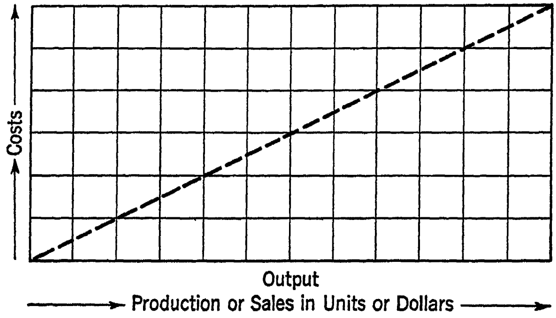


Chart 6-A. Profit and loss cost line.

The breakeven point brings up an important rule of management, a rule vital in decision making.

No company makes 10 per cent profit for a given period. It made a 10 per cent profit because two-thirds of the volume was needed to break even and on the remaining one-third of the volume 30 per cent was made to produce the average of 10 per cent.[1]

Herein lies the key to better understanding of costs and/or profits. Controls to be successful must illuminate these factors individually, not hide them. That is the job that standby and variable costs at the department spending level accomplish when they are tied into breakeven points and profit and loss statements. For one more repetition, see Charts 7 and 7-A.



= **HOWEVER,**
your sales line
does go up like
this

Chart 7. What makes a breakeven point tick, step 1.

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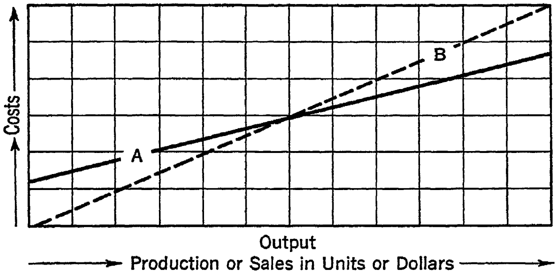
[1] Proportions used here are to illustrate ideas only. Both the breakeven point and the percentage made above the breakeven will vary between companies and industries.



= SO, you get a Breakeven Point because Slope A and Slope B are different

Chart 7-A. What makes a breakeven point tick, step 2.

What Makes a Breakeven Point Tick? From the simple illustrations above we have found what makes the breakeven point tick. There is nothing added which destroys what is already in use. The purpose of the illustration was to magnify and make dynamic the statistics of management which are a by-product of accounting and accounting routines. With the segregation of standby and variable factors from which a breakeven point originates and is supported comes a new concept of the old problem of understanding costs and their habits.

Conclusion and Summary

1. Certain costs are fixed in nature because of organization, corporation structure, type of industry, etc.
2. Some costs do not vary directly with volume because management has not the know-how, the information, or the money to make them vary.
3. Some costs do not vary because management by habit or decision chooses not to vary them directly:
    - *a.* Management refuses, for instance, to fire itself. No chief engineer, chief inspector, or district sales manager will eliminate himself from the payroll.
    - *b.* Management does not know enough about its costs on an up-to-date basis. Costs are six weeks old and not visual.
    - *c.* Control of costs is too slow—*lag* in execution appears.

CHAPTER 6

THE LAWS OF PROFITS

Introduction. Profits are a broad term and are the result of several conflicting conditions of business management. The many reasons for profits have a tendency to intertwine themselves around the gross margin ratio, causing considerable confusion in interpreting the effectiveness of specific periods of profit management. A static ratio does not provide good management with enough facts. Management wants to know the *why* of profits in order to control the several factors which can distort profit performance.

Three Factors Affecting Profits. The three major factors causing profit variations are:

1. Mix-of-product changes
2. Performance changes on any volume
3. Volume fluctuations

A discussion of each reason follows.

1. Mix of Product. The mix-of-product effect upon profits is fairly easy to interpret and record if a *good* cost system is in use which does an equitable and positive job of cost distribution among the several lines of product.

Composite gross margin changes as the relationship of high-margin lines to low-margin lines changes in particular accounting and/or cost measurement periods. When actual mix relationships are compared with expected line proportions, or a past relationship, the profit variation due to mix of product can be measured. To illustrate, a company may have three lines of products, one with a normal 10 per cent gross margin, another with a normal 20 per cent gross, and the third with a normal 30 per cent gross margin. It may be planned, or past experience may indicate, that each line should do or has done one-third of the dollar volume. The normal gross margin for such a company would be 20 per cent. In one specific month, however, the 30 per cent line may make up 50 per cent of the total business; conversely, the same line in another month may contribute only 10 per cent of the total, causing major changes in profits without corresponding changes in sales-dollar output volume.

The shift in composite gross margin and the effect on profits of a shift in this relative weighting of a line above its normal can be readily discerned in arithmetical calculation. Table VIII demonstrates how this can occur.

TABLE VIII. LOSS OF PROFITS DUE TO MIX OF SALES

	Line A	Line B	Line C	Total
Net sales for month........	$300 000	$800 000	$400 000	$1 500 000
Gross margin..............	$ 90 000	$ 80 000	$ 80 000	$ 250 000
% of net sales.............	30%	10%	20%	16.7%
Forecast of normal sales....	$500 000	$500 000	$500 000	$1 500 000
Normal gross margin.......	$150 000	$ 50 000	$100 000	$ 300 000
% of net sales.............	30%	10%	20%	20%
Loss in profits due to mix of product................	....	....	....	$ 50 000

After breakeven data are available by lines, this calculation will be a by-product of profit analysis. Mix is important in profit analysis because it plays tricks with profit comparisons. It is not impossible to see two months each with identical sales volume, one registering a 10 per cent profit, the other recording a loss of 10 per cent, the entire 20 per cent variation being due to distorted mix of product.

2. *Volume of Output in Salable Goods.* Volume plays a tremendous part in profit making. So long as sustained maximum volume continues at the top of the capacity curve, breakeven points look very far away. The profit path is wide and deep at this point. This is illustrated simply in Chart 8.

The percentage of profits is extremely good at high levels because there are so many increment units of volume above the breakeven point (Point 3 on Chart 8), and many times manage-

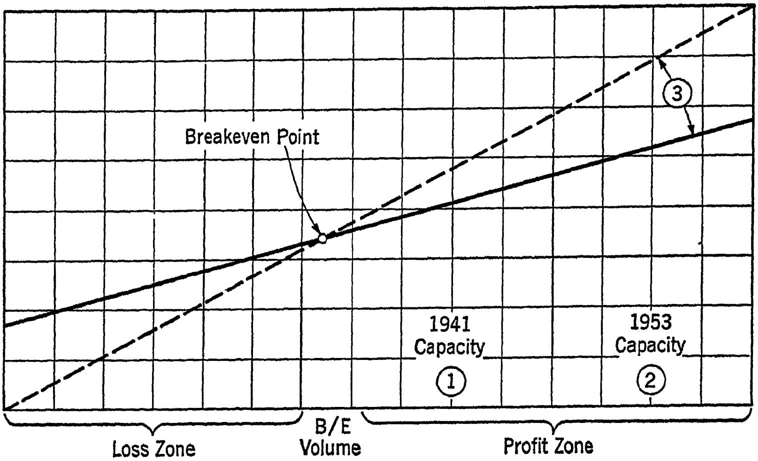


Chart 8. Profit-path characteristics.

ment is misled because a 16, 17, or 25 per cent profit looks fabulous as a percentage. The important thing here, however, is how efficient are the operations that produced the profit at this particular volume. Should profits be 10 or 18 per cent or should the profit be 25 per cent? Present methods of accounting and costing do not do a good job of exposing or explaining. With a detailed breakeven there is no question about what the profit should be at any volume of sales.

Example: Company X has the following costs: standby costs, \$600 000 per year; variable costs, 60 cents per \$1 of sales; breakeven point, \$1 500 000 net sales. Present sales volume is \$6 000 000 yearly. Therefore,

$$\$6\,000\,000 - \$1\,500\,000 = \$4\,500\,000 \times 40 \text{ cents} = \$1\,800\,000 \text{ profits before tax}$$

$$\% \text{ profits to net sales } \frac{\$1\,800\,000}{\$6\,000\,000} = 30 \text{ per cent}$$

Similarly, at \$4 000 000 annual sales, 25 per cent of net profits is as good a job and meets the breakeven goal of \$1 500 000. Note: \$2 500 000 sales above the breakeven × 40 cents on each sales dollar = \$1 000 000/\$4 000 000, or 25 per cent.

While the rate of profits is apparently high at 30 per cent, to get less at this volume means that the breakeven has increased or that the pickup per unit has decreased. When a management coasts on the high volume and allows the profit pickup to fall off, it is inviting poor showings at lower volume and surrendering something of its margin of safety above its former breakeven point.

3. *Performance on Any Given Volume.* No real sophistication in profit understanding (which seems unimportant when profits show a high percentage) can be attained nor can a real approach to profit correction be made unless the true profits at any given volume which should exist on a planned breakeven point are separated from the profits created by the performance on one attained volume. Over the past few years the author has been interested in a company which has shown 15.5 per cent profit before taxes after all operating charges. The company would be happy year in and year out to maintain a 14 per cent profit before taxes. But the 15.5 per cent is the result of high volume in a product which has not been able to meet a demand so great that the maximum capacity of the company has been taxed month after month.

Based on the company's planned breakeven point, it was found that profit at this volume must be 23 per cent, if the 14 per cent average were to be maintained at 80 per cent capacity over a cycle of years.[1] This meant that through lag, errors in profit performance, complacency, etc., there was a 7.5 loss of profits on each dollar of net sales.

To illustrate this measure of profit efficiency: If at $4 000 000 net sales the actual profit were $900 000 instead of the $1 000 000 expected from the breakeven formula, then the loss of profits due to performance would be $100 000.

From this determination the company critically analyzed its performance. Although the company did not quite achieve the 23 per cent profit before taxes expected at the existing high level of output, it came close. Management realized that being satisfied with a "good" 15.5 per cent when at this volume it should have been 23 per cent potentially was a six-point handicap in profit performance in case of a reduction of volume. Were this handicap heaped upon the normal problems which occur with falling volume the job of profit control could become insurmountable because of the starting lag.

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[1] Review car case, p. 32, and Table IV-A, p. 36, to see the full significance of volume and profit ratios.

A "good" profit ratio at high volume may divert attention from the existing profit lag. As soon as volume falls, however, the profit lag shows up immediately with all its impact. Remember, just to maintain the breakeven point as volume falls rests on two prerequisites: to start with, full breakeven performance at the top volume before the fall off; and secondly, elimination of the full variable cost for each unit of output lost.

When the downturn occurs while lag in control continues, management is in a position similar to that of a quarter-mile runner who falls down at the start of a race. He may be the best finisher, but his original starting handicap is too much to overcome.

Understanding Profits Becomes Routine. Returning to the company used for an example, it should be pointed out that by an evolution of profit understanding the company not only has been able to pick up the additional percentage of profits lost but has created other savings along the line which have made it easier to maintain the present breakeven-point position. It will also be easier to reduce selling prices when such a move becomes necessary. A realization developed within the organization that a seemingly good 15.5 per cent profit on the enjoyed high volume was too low. By segregating profit due to volume from profit due to performance, an entirely new level of profit understanding was reached. Because of this refinement in profit measurement the organization, as a whole, has been revitalized and disciplined in profit thinking, ready for any of the storm clouds which may gather.

Only with breakeven analysis and a segregation of the effects of product mix, of volume, and of performance can the question of the "why" of profit variations be clearly and concisely answered. The laws of profits which follow will better illustrate these concepts and emphasize their related importance.

The Laws of Profits. The laws of profits and the effects of changes in standby and variable factors on the breakeven point and consequently on profits are vital knowledge to good management. They come automatically if there is discerning understanding of the breakeven point and the standby and variable components which make it up. These laws of profits follow:

I. A change in the standby will change the breakeven point but not the marginal profit.

II. A change in the variable will change both the breakeven point and the marginal profit (i.e., profit picked up above the breakeven point).

III. A change in the selling price will change the breakeven point and the marginal profit.

IV. The rate of marginal profit is affected by change. Change can appear:
   A. In variable costs
   B. In selling prices
   C. In operating performance compared with planned performance

V. When both *standby* (time) costs and *variable* (volume) costs change, the effect on the breakeven point is extremely marked and definite when they move in tandem, but minor when they move in opposition to each other.

VI. Marginal breakeven point is that point of output at which out-of-pocket costs are recovered. Depreciation and amortization are the principal costs not requiring current cash outlay to be excluded from out-of-pocket costs.

The laws of profits will be discussed individually.

Law I. A change in the standby will change the breakeven point but not the marginal profit. Any increase in standby, once accepted in the cost structure, is inflexible in nature and is strongly resistant to reduction when breakeven points must be lowered. See Chart 9. The effect of such changes should be carefully weighed before they are created. Unless in a reasonable time

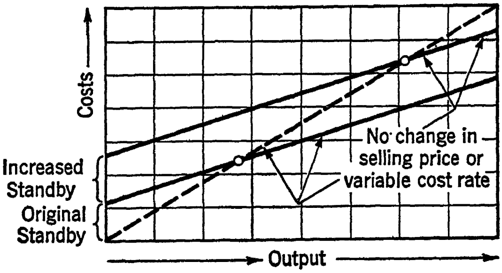


Chart 9. Laws of profits—effects of standby change.

variable cost is reduced enough to more than offset the increase in breakeven point, they should be avoided. The increase in standby cost may be worthwhile, but it should always be subject to proof.

Standby increases fall into two typical categories—those of positive decision and those of default decision. Frequently appearing examples are these:

A. *Positive decision may increase standby costs*
   1. Addition of plant to expand capacity.
   2. Addition of sales offices to tap new markets.
   3. Implementing advances in technology or labor saving with new equipment—the depreciation charge appears as standby.
   4. Instituting product-research programs separate from normal engineering activities.
   5. Changing from commission to flat salaries for compensating salesmen.
   6. Refining organization structure by splitting general functions and creating new departments and subdepartments. A plethora of "titles" is a warning signal.
   7. Allowing long-term minimum-fee contracts.
   8. Changing from manual accounting to punched-card accounting.
   9. Establishing manufacturing facilities to make components previously purchased.
   10. Changing from day work to incentive pay systems. Be sure the administrative standby does not offset the advantages to be gained.

B. *Default decisions increase standby*
   1. Permitting lag in control; this is the root of most default decisions and covers a multitude of sins.
   2. "Retention of labor skills" at the bottom of wide seasonal fluctuations.
   3. Deferring maintenance because "we can't lose the production." The boys ride the maintenance accounts on the low side of plant activity.
   4. Organizing supervisory forces for three-shift capacity when two shifts is more nearly a normal expectancy.
   5. Using all forms of specious reasoning to stretch the work to fit the force when declines appear.

6. Overshooting force and replacement of force turnover at peaks of orders received.
7. Elaboration of record keeping in violation of the exception principle.
8. Allowing what is "nice to have" because "we must do things in a big way." This kind of default appears as large guard forces, overelaborate reception procedure, excessive telephone and communication systems, "phony" personnel activities, burgeoning of personal secretaries, and a host of others. It is sometimes known as "YMCA engineering."

Law II. A change in the variable will change the breakeven point and also the marginal profit. These changes are of great day-by-day importance because they increase the breakeven point, usually in such insidiously small proportions as to be unnoticed for considerable periods of time. They are less disturbing than Law I costs because they can be retracted with greater ease. Breakeven-point increases caused by rising variable costs rather than by standby are less dangerous unless management lets them lag when the volume falls. Should these costs be allowed to remain when the volume disappears, so-called variables convert to standby or Law I costs of the default-decision type. See Chart 10.

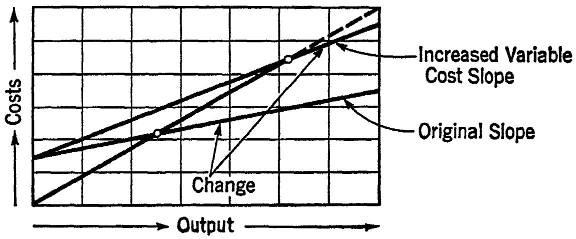


Chart 10. Laws of profits—effects of variable cost change.

The underlying inherent variability of costs is determined usually in the course of planning the business product or service. Deviations from plan for worse or better occur in the course of day-to-day operations. Maintaining the rate of variable costs or improving it calls for continuous attention. Increases can be large and sudden; decreases are usually small and hard-won.

Again, our listing is a representative sample and has no pretensions of completeness:

A. *Planning decisions affecting variable cost*
   1. Specification of grade and type of material used in product.
   2. Product design; labor operations required to produce.
   3. Multiplication of executions of basic design.
   4. Degree of interchangeability of parts.
   5. Degree of integration of manufacture back toward the sources of prime material used in the product.
   6. Frequency of revision of engineering design, which may appear as increased variable costs in the form of inventory obsolescence or excessive cost of stockkeeping.
   7. Method and rate of wage payment, that is, day work, straight-line incentive, or some form of sharing productivity. Note: Wage increases per hour worked over and above straight-line incentive earnings have the effect of sharing productivity but introduce standby into the cost structure.
   8. Trade discount and commission rate and policies. Though trade discounts are most often netted against sales billed, the true effect may be a change in variable cost of distribution and duplication of payment for a distribution function.
   9. Multiplication of shop-order, purchase-order, and sales-order copies. The clerical handling and keeping of cost records are more significant than the cost of the paper itself.

B. *Operating decisions affecting variable cost*
   1. Quality-control standards and their complementary effects on the costs of inspection, rework, and manufacturing spoilage.
   2. Application of grades of labor other than standard to the work to be done.
   3. Material purchasing practices generally.
   4. Material utilization in the course of manufacture.
   5. "Hidden make-up" in the form of expense time allowances and ostensible expense time work assignments for productive operators.
   6. Manufacturing lot size.

7. Extension of job-training time allowances.
8. Advertising allowances based on volume.
9. Operating-methods analysis; work simplification or the lack of it.
10. The multifarious forms of *lag* when permitted to develop as permanently lowered rate of productivity of either labor or materials, direct or indirect.

Law III. A change in the selling price will change the breakeven point and the marginal profit rate. See Chart 11. The relative change in marginal profit rate will be greater than the relative change in variable cost rate.

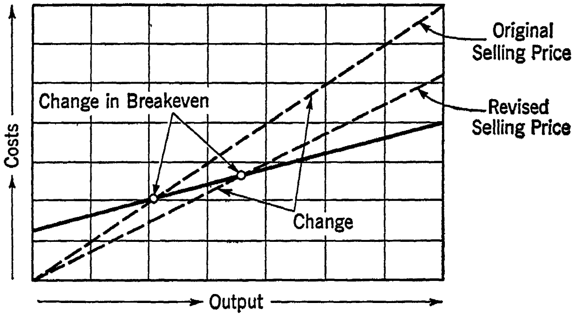


Chart 11. Laws of profits—effects of selling-price change.

The effects of selling-price changes on breakeven points are positive and can be directly compared to indicate the amount of sales values plus or minus necessary to ensure the same profit results after the selling-price changes.

Typical of the conditions which lead to this effect on the breakeven point are:

1. Change in selling price up or down due to the competitive situation.

2. Change of internal relationship in the total sales dollar between high-margin and low-margin items. This is discussed elsewhere as the effect of mix of product on the breakeven point.

Law IV. The rate of marginal profit is affected by (A) change in variable costs; (B) changes in selling prices; (C) the performance actually realized compared with the cost performance as *planned.* Marginal profits change only when the slope of either the sales line or the variable cost line changes, since either will affect the angle of the profit wedge. Standby cost changes will change the point at which the jaw hinges rather than the angle of the wedge. See Chart 12.

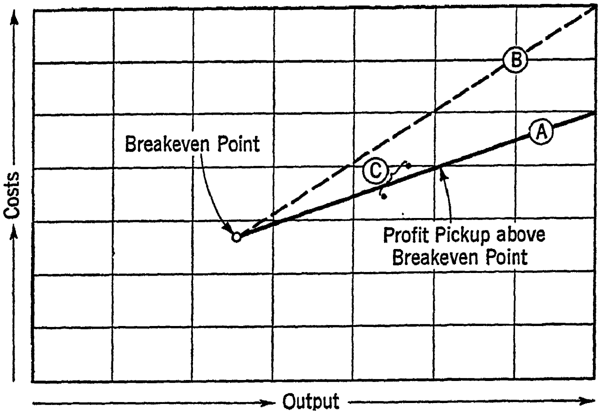


Chart 12. Laws of profits—the profit path.

Typical of the conditions which lead to this effect on the breakeven point are:

1. Change in performance above or below 100 per cent realization of the planned cost pattern in any department included in the cost line.
2. Change in the selling price per unit sold.

Law V. When both standby (time) costs and variable (volume) costs change, the effect on the breakeven point is extremely marked and definite when they move in tandem, but minor when they move in opposition. See Chart 13.

Typical of the conditions which lead to this effect on the breakeven point are:

1. Increase in standby or variable costs, or both, due to poor cost control.
2. Balance or lack of balance between the added depreciation standby resulting from new plant and equipment and the amount contributed in reduction of the variable cost rate.

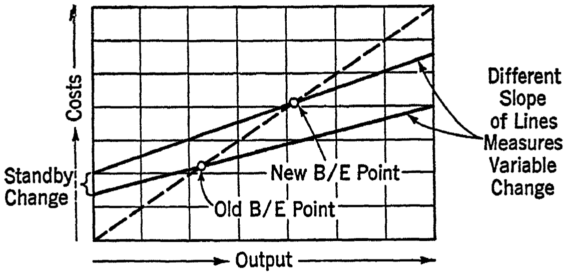


Chart 13. **Laws of profits—effect of multiple cost change.**

Law VI. Marginal breakeven point is that point at which out-of-pocket costs are returned. Managements are frequently tempted to take business at substandard prices which return some margin over out-of-pocket costs. It is theoretically true that any price in excess of out-of-pocket is better than not having the business, and to the extent of the excess it does help to spread overhead. Nevertheless, the composite breakeven point rises automatically, and new problems present themselves. See Chart 14.

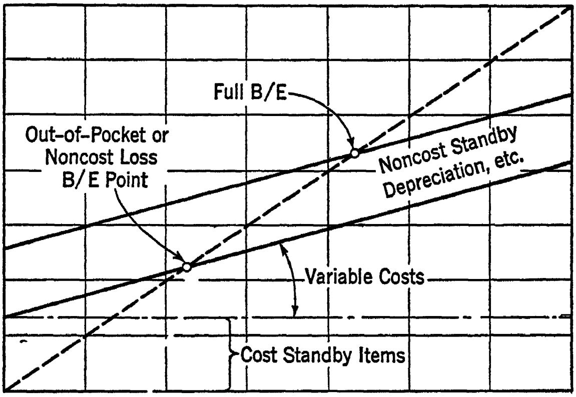


Chart 14. **Laws of profits—effect of marginal costs on breakeven point.**

Codifying these problems brings us to these conclusions, conservative as they may seem:

1. Out-of-pocket pricing may be indulged in with safety *only if* that business does not exceed 5 per cent of the current activity.

2. The 5 per cent rule applies only when the total activity does not exceed 90 per cent of plant capacity.
3. No additional capacity, either in plant or in organization, should be acquired to handle such substandard-price business unless it is adequately provided for in such price.
4. Cost estimates on proposed out-of-pocket plus margin for overhead spreading should be carefully checked for possible creation of standby costs for the sole benefit of this so-called "plus" business. If the product proposed is foreign to regular products, it is likely that such standby will be appreciable.
5. If the proposed "plus" business is closely related to regular product lines, or closely competitive with them, the company's general price structure is in jeopardy. The "plus" business may cause a permanent increase in the breakeven point and a narrowed marginal profit by weakening the market.
6. Remember that substandard price does not entitle the buyer to superstandard or even standard service just because his purchasing quantities are large from his point of view. If you have not too seriously compromised the 5 per cent rule stated above, you will be able to withstand his pressure based on volume.
7. All so-called out-of-pocket pricing invokes operation of the third law of profits.

CHAPTER 7

WHY BREAKEVENS CHANGE

Introduction. The breakeven point has been described in previous chapters as a summary reflection of the quality of business management. Even as one knows that one's quality of performance varies from time to time, it is logical that the effective breakeven point also changes. Where operations are under good control, the effective breakeven point moves in a narrow orbit never very far from the planned breakeven-point goal. Where coordinated control does not exist, the shifts in the effective breakeven point can be startling. An understanding of the reasons for changes in the breakeven point, and the root causes, is useful for interpreting, anticipating, and minimizing possible adverse effects upon business profitability.

These influences may be working alone or in combination to affect the *profit path* at any given time:

Reason for Change in Breakeven Point	*Internal Causes*	*External Causes*
1. Lag in control action	Quality of inventory control Production flexibility Forecasting ability Wishful thinking, lead time	Cyclic waves in business activity
2. Marginal profit variations	Shifts from normal in output relationship between high and low margin lines	Selling price changes due to —industry price competition —prime material and labor supply —technologic change
3. Law of diminishing returns	Production, distribution, or capital inefficiencies	Industry capacity utilization

Reason for Change in Breakeven Point	*Internal Causes*	*External Causes*
4. Growth	Standby added to increase organization capacity or to bolster present organization	Delays attributable to new construction and "proving-up" new facilities
5. Working-capital deficiencies	Shortage due to growth of inventory or other operating needs	Inability to borrow sufficient money at acceptable rates
6. Management thinking	Product changes Easy times Unpleasant facts	Product changes Easy times

Of all the possible influences upon breakeven points and profits, none is so devastating as *lag.*

Lag in Control Action. Lag, in general, is the tangible evidence of management inability to keep abreast of the demands for action when output is falling. As a result, the breakeven point rushes up from its old position to meet the reduction in output and quickly erases much or all of the former margin of safety on which management depended.

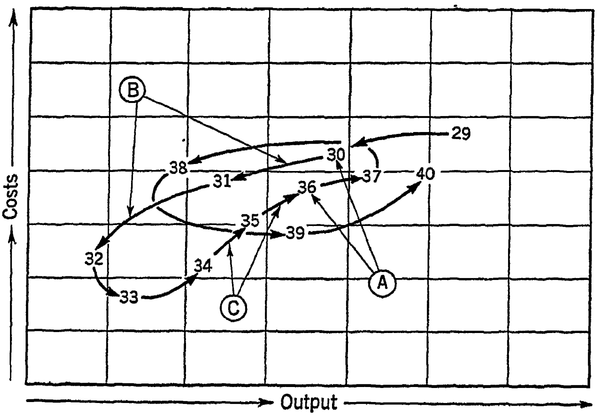


Chart 15. Illustration of lag.

Lag in cost control is typical, rather than exceptional, in industrial management. For approximately 900 of American first-line companies, the twenty years prior to the Second World War twice showed serious lag in control of costs. The composite pattern for these companies, based upon Securities and Exchange Commission and other data, is shown in Chart 15.

Sales outputs were closely alike for the "downside" year 1930 and the "upside" year 1936 (see *A* on Chart 15). Notice how costs resisted the falling off in volume through 1932 (see *B*), and how costs acted in the revival to 1935 and 1936 (see *C*). Because management could not reduce costs fast enough on the downside, it cost about 18 per cent more to do business in 1931 than it did after the recovery to 1935. The same pattern with some exaggeration recurred in the sharp falling off from 1937 to 1938 and subsequent recovery in 1939 and 1940. This is a picture of the effects of *lag*.

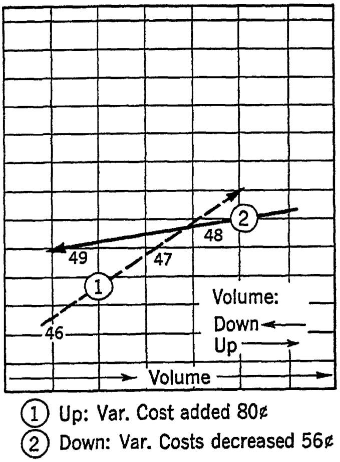


Chart 16-A. Cross section of 118 manufacturing companies, each with assets of less than $1 000 000, 1946–1949.

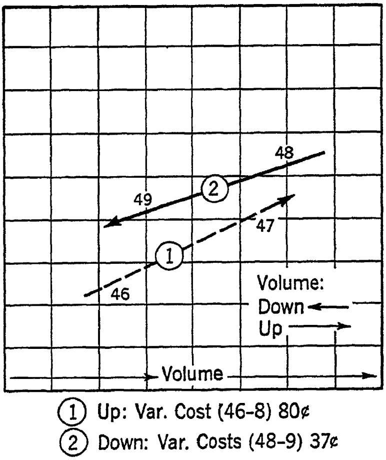


Chart 16-B. Cross section of 82 companies, each with assets over $50 000 000, 1946–1949.

Postwar, we find about the same condition. In Charts 16-A and 16-B, the rate at which costs were *added* from 1946 to 1947 is indicated by slopes steeper than the rate at which costs were *removed*, 1948 to 1949. This means that there was again a lag in cost control due either to failure of management to cope with the problem or to lack of desire to do anything about holding costs in line with the falling volume. In many companies, management was hampered because factual information concerning what was happening became available too late for management to keep abreast of the situation. In any case, there was a deficiency in 1949 profits which was difficult to excuse, and difficult to restore to the achievement level of 1947. Lag not only cuts down profits as soon as it appears but also shows a strong tendency to become chronic and permanently damage the breakeven position.

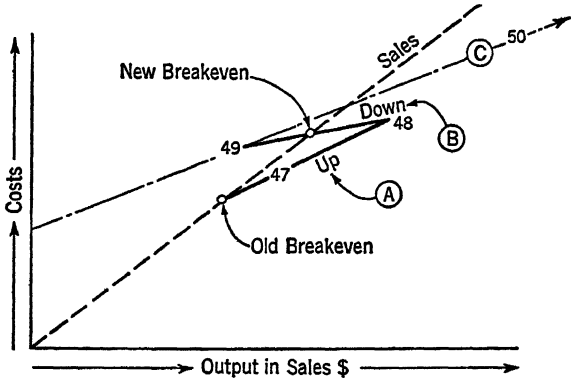
These charts (one of actual performance of 118 manufacturing companies each with assets of over 1 million dollars and the other of 82 companies each with assets of over 50 million dollars) demonstrate that companies of *all sizes*, whether large or small, face this same problem of *lag*.

Do Not Overlook Lag Today. Do not pass over lag too lightly. As of today, many companies have not experienced lag in years, having been on the upswing of business month after month. Too many managements, softened by absence of lag problems for as much as 15 years, think they will overcome the problem with drastic action when necessary. As with new-year resolutions, however, good intentions are not enough. The uncertainties of new conditions and lack of experience and understanding to cope with the specific problems of falling volume indicate that lag may be more severe in the future and much harder to check, once started, than ever before.

Costs Are Less Flexible Today. In Charts 16-A and 16-B, it is obvious that the difference between costs on the upsurge and those on the downswing is due primarily to inability to keep abreast of fast-sliding volume, and hesitancy in restoring the overhead capacity of organizations as business perks up. During the period of 1930 to 1940, we saw the pattern repeat itself, and it was confirmed from 1946 through 1949.

Since these major nose dives, individual industries have shown a tendency to be *less* flexible in coping with falling sales. While these several volume sinking spells have been experienced mainly by industries in soft-goods lines, all the evidence points to less flexibility in cost control. Compared to yesteryear, breakeven points rush upward even more rapidly when volume drops.

Though *lag* may be typical, it is not necessary. Continuous measurement of accounting data against the planned cost patterns supporting the breakeven-point goals supplies management with adequate warning of the extent and locus of lag as it develops. The risk and penalties are always known, and the facts promptly available go far toward eliminating the procrastination of wishful thinking.



Ⓐ Up 81¢ for each dollar of sales added '48 over '47
Ⓑ Down 52¢ for each dollar of sales lost '48 to '49
Ⓒ The year 1950 cost upswing started from the '49 level, not '48; with LAG freezing into costs as standby

Chart 17. Textile industry.

Why Is It Difficult to Maintain the Increment Pickup? For a company having a variable cost of \$0.75 per dollar of sales, a standby of \$1 000 000 per year, \$4 000 000 net sales are required at the selling price on which the breakeven pattern is based, to absorb a million dollars' standby and to break even:

$$\frac{\$1\,000\,000}{1.00 - 0.75} = \$4\,000\,000$$

If the business is to maintain its profitability level of efficiency, the actual cost performance may not exceed the planned allowances of the standby and variable breakeven factors, and at \$4 000 000, one can always depend upon a breakeven relationship.

Since the variable costs are \$0.75 on a dollar of sales in this particular breakeven plan, and since all standby costs have been absorbed at \$4 000 000 of net sales, then above the breakeven point the pickup per unit of sales is \$0.25 for each dollar of sales

($1 selling price minus $0.75 variable costs = $0.25 pickup). With this fact and with no other influences involved, it is true that for each additional dollar of output, if costs are controlled to the breakeven formula, profits will increase by $0.25 per unit.[1] This is known as the increment pickup per unit of output above the breakeven point.

There are seven basic reasons why the increment pickup in any individual company may not always be maintained.

1. *Law of Diminishing Returns.* In many companies the addition of variable costs at the ratio maintained up to and beyond the breakeven point to a normal output cannot be maintained at near-capacity levels because of the structural setup of the business, and because the last-added variable people may not be as effective as the normal organization. For example, overtime premium, second- and third-shift concessions, make-ups of all types, inefficient material handling, supervision below normal standards, crowded clerical offices, lack of sales direction and training of added salesmen, any or all of these, contribute to loss of efficiency. Distorted variable costs per unit of output make their appearance in administration and selling as well as in manufacturing.

With continual addition of commission salesmen, management often expects sales to be stepped up in direct proportion. The additional men are assumed to be able to match the average of the men already in the going organization. This is usually not true and is too often very untrue. It is not uncommon to find that by increasing the sales force 25 or 30 per cent in number of men, less than 10 per cent additional volume is secured.

There are natural reasons for lowered productivity of an expanded sales force.

a. The redistribution of territories may give intensive coverage to lower-potential and undeveloped territories.
b. The additional sales people may dilute the over-all competency of the sales organization.
c. Supervision of those people may not be so effective since present supervision must be stretched or requires supplementing.

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[1] In this discussion, "profit" means profit before taxes on income.

These are but a few of hundreds of reasons and are cited here only to help the reader to visualize the hazards.

2. *Creation of Additional Standby.* As business grows in size the organization of standby people—people who do not vary with volume—may be increased. It may be necessary to appoint a regional district manager to supervise the growing sales organization. It may require additional supervision of production control, of inspection, of toolmaking, and of many other functions of business. The material increase in the number of standby people and things may really be a needed increase in organization capacity, but the breakeven point can readily rise, in our illustration, from 4 million to 5 million dollars.

This means that on the difference between 4 million and 5 million dollars, the previous pickup of $0.25 is lost, and enough additional sales must be obtained to absorb this added expense. For each $1 000 of increased standby, at $0.25 variable pickup, there must be $4 000 of additional sales to break even on the addition.

3. *Additional Working Capital.* Many companies (and this problem is not restricted to the period since the war) have found too late that they do not have adequate working capital to handle additional volume. In tying themselves up so tightly, performance on the additional volume has suffered strictly because of their working capital situation. The chapter on capital coordination (Chapter 10) discusses this kind of distortion and its effects.

There is a positive, determinable relationship between the effects of volume on profit and the effects of volume on capital requirements which should be used in management in deciding whether additional volume is desirable from the point of view not only of volume but also of capital availability efficiently to handle the added volume.

Lack of working capital may cause embarrassment to such a degree that creditors take over, but more often poor operating performances often appear as a variable pickup materially lower than normal. For example, instead of making $0.25 in our illustration, the variable pickup may be reduced to $0.23 because of operating inefficiencies arising out of preoccupation of executives with raising capital and distorted inventory balance. This lower profit pickup, reduced only 2 cents to $0.23 instead of $0.25, will require 5 per cent more volume to meet a given dollars-of-profit goal, thus aggravating a poor working capital condition. There is no end to the problems created by thinking in terms of big volume output—when working capital availability falls short of supporting one's dreams.

4. *Effects of Increases in Available Products on the Market.* At increased volume more units of production flow into the consumer market. Many times these units are needed to supply a temporary demand, but often additional units produced take business away from competitors. Taking away a competitor's business may be equivalent to an ultimatum to the competitor to reduce prices, which is good if supported by cost reductions, but bad if not. Too often there follows a weakening of the entire selling-price structure. Proportionately, the pickup per unit of sales above the breakeven point is reduced. Similarly to a working capital shortage, this conduct also causes the breakeven point to rise and additional volume is required to show the same profit results.

The cycle is vicious and frequently destructive. The arbitrary decision that added volume is the end to most of the problems suffered when the profit performance is not satisfactory is the most damning and yet least understood problem of management today.

5. *Change in Point of View.* Adding costs as volume expands (variables) and then failing to remove them when business returns to the comparable levels of activity at which costs were added creates *new* standby which results in higher breakeven points and less cost flexibility. Thus as new costs are added, their basic character must not be lost sight of, nor must the point of view from which they are appraised be allowed to shift.

6. *Easy Times.* When profits are easy to come by, cost attitudes are often lenient. Expanding organizations, long-term obligations, etc., none of which pries loose easily when business recedes, are too often causes for standby cost excesses which distort normal breakeven patterns.

7. *Change in Selling Prices.* The effect of a change in selling prices has been cited in the laws of profits. Relatively small shrinkage in sales prices will force high variable cost companies below or dangerously close to breakeven.

All seven of these profit usurpers are constantly challenged and checkmated by good breakeven control supported by standby and variable factors. While such control does not ensure against factors which destroy pickup above the breakeven point (and thus profits), it presents a warning to the organization in good times which, if heeded, at least by plan, will make the problems of below-normal times easier to solve.

Will Breakeven Come Down if Business Drops? Many executives think that when the time comes, their breakeven will be reduced by drastic action in proportion to the adversity of the situation. Most of us have not had to reduce costs on a sustained basis since 1938, and that need was over before it involved many present-day executives. Let us hope we will never have another 1929–1932 or even a baby facsimile thereof, since most of the intermediate and junior executives who must be depended upon for cost control and profit-path performances in any future readjustment have never operated on the downswing.

Management should appraise the hazards involved in reducing the operating breakeven point—in fact, the great hazards involved in just maintaining the present breakeven point.

1. If variable costs are $0.75 per dollar of sales as measured by the cost path and breakeven control, then just to maintain the present breakeven point requires a reduction of $0.75 for each and every dollar of sales lost. If less reduction is obtained, the breakeven will increase as sales decline. If costs are reduced more than the $0.75 required, the breakeven will drop.
2. Taking off more than $0.75 variable for each dollar of sales is not easy because of *lag* unless controls are converted into results fast, clearly, and by organization control channels. Reducing $0.75 eventually is not satisfactory either. It must come off immediately or it creates lags, which means that in a short time the reduction must be at least 90-cent and sometimes $1 cost reduction per dollar of sales to catch up with accumulated lag.
3. The only other avenue toward lower breakeven points is reduction of the standby costs, mainly in people and certain material functions such as telephone setup, power, maintenance materials, building premises, upkeep, technical data, etc., none

of which can be reduced without reorganization, conference, hidden temporary losses, and often restrictions in flexibility essential when activity returns to something like satisfactory levels.

4. Inability to determine at once the extent of a volume dip often results in indecision in carrying out retrenchment programs required by the profit-pattern setup. The indecision caused by the insidious or slow start of the fall may cause a characteristic falling behind in reducing the $0.75 variable cost. When it is finally decided to reduce cost (mainly hidden unseen costs of overhead), one must then not only reduce the current requirement of $0.75 but also make up deficiencies which accrued during the waiting period of uncertainty or the breakeven will increase.

Conclusion. Management is paid for performance. Breakeven changes reflect the composite or the net weighting between good and bad profit results. Management strives for good, not bad; here is a device to measure its composite results. Since breakevens *evaluate control, they express the trend toward better or poor management as it develops, not after it is too late.*

CHAPTER 8

DETERMINING TIME AND VARIABLE FACTORS

Introduction. A study of breakeven points has indicated that a sound breakeven point is not possible unless the *time* and *variable* components of costs are clearly segregated by centers of control.

In order, then, to have an understanding of the profit path, the profit formula becomes selling prices − (standby costs + variable costs) = profit or loss.

An over-all breakeven point which summarizes factors of standby and variable components without supporting detail is too superficial to furnish alert management with sufficient control information to ferret out standby and variable cost information at the expenditure level. To accomplish this, certain fundamental concepts must be established, accepted, and applied to accounting procedures before reports can be obtained which can enlighten control of profits.

Base for Breakeven Control. Since management is in business to make money, something must be sold to provide the money. This something may be a service rendered or a product with value which is sold for money. Since the profit and loss statement is expressed in sales dollars, the most common element of measure in any business is the sales dollar.

Unfortunately for detailed control, the sales dollar does not always measure closely enough the business activities under observation. Other measures of activity must be used which are by-products of the sales dollar but which can themselves be correlated to the master measure of sales dollars.

Before discussing various types of bases which may be used, it is important to study the requirements of any base or measuring factor used to measure the activity to which other costs are related for control. These are:

1. Convenience of data available
2. Ease in computation of base
3. Ease in understanding the base
4. Ease in policing the base
5. Ease in conversion to a master base

1. Convenience of Data Available. The control bases used should be selected from measures of activity conveniently available. Many controls fall by the wayside if it is necessary to set up a special procedure to obtain an extraordinary degree of accuracy. Adding new work for new reports which in themselves are not usable should be avoided. Find a way to get more out of what is already kept as a by-product of the information flowing to accounting.

2. Ease in Computation of Base. If the base becomes the result of an algebraic formula or requires tables of technical knowledge to determine, it will lose its value as a quick management reference. If the base is not easy to compute, the control cannot be easy to understand or simple to operate.

3. Ease in Understanding the Base. If the base selected is expressed in terms familiar to those who must work with it, the control will be more useful to the entire organization. For example, in a punch-press department the sales dollar is extremely remote from the thinking of the man who uses direct labor or machine hours as the measure of his activity. He visualizes the costs of his department in terms of these productive direct labor measures.

4. Ease in Policing the Base. Since the base that is selected is so important in the effectiveness of the control, it must be easy to check. If there is no way to police or control the base, it may get out of hand without management's knowledge, e.g., actual direct labor may be inflated by excessive scrap or day work; gross units of production or sales may be used when net measure is at times materially and irregularly lower.

5. Ease in Conversion to a Master Base. It is unwise to use a base that does not bear a true relationship to output. Sooner or later in order to issue a profit and loss statement, all the individual base factors that make up the detailed segments in day-by-day control of the individual elements must be converted to the sales dollar.

In order to arrive at the final breakeven point, it is necessary that all the bases other than sales dollars be converted to sales dollars before the composite or over-all breakeven can be summarized. Just as in multiplication fractions must be converted to a common denominator, the bases must be converted to a common denominator of sales dollars. Final profit and loss and breakeven standards can then be summarized and projected against forecasts of future volume.

In preparing the basic data for breakeven support, care must be taken to see that the bases selected are representative of why money is being spent. If the bases are involved, numerous, and tenuous, time and energy necessary to convert them to a common denominator may be wasted because the information cannot be used for any other purpose.

Frankly, the number of bases used in the detail for breakeven control is a delicate decision requiring judgment, the application of the law of diminishing returns, and an ability to avoid handicaps. Some bases may look good for localized control but may delay beyond reason the summarized or final presentation. Years of experience indicate greater chance of erring on the side of having too many bases rather than of having too few for adequate control. Unless the base finally selected for some local control can be correlated to sales-dollars activity, local controls cannot be converted to effective management information.

Types of Bases Used. While the following list does not include all the acceptable bases which can be used in *time* cost determination and control, it represents a fair cross section of the ones most generally used which meet the tests of ease of computation, understanding, policing, and ease of conversion to a master base:

General or Master Bases

Total net sales in units or dollars
Physical units (pounds, tons, yards, etc.)
Net sales by lines of products, pounds, yards, etc.

Our economy expresses itself in dollars, and the measure of final results in the profit and loss statement has its origin in net sales.

These and many other bases which could be used to represent the reasons for spending money in some local segment of the business must be convertible to a common-denominator base. In the final analysis, the logical common denominator is the net sales dollar, the binder between breakeven data, and the profit and loss statement. It behooves one in selecting a base for localized control to weigh carefully the inconveniences of the detailed base in converting it to the single master base versus the extra advantages which accrue by use of a special base better understood by the local department heads. In many industries there are many subsidiary bases which are acceptable for control purposes and which measure better than sales the reasons for spending money at local levels. To illustrate, in merchandising—number of transactions; in the steel industry—weighted tons of products.

When the units of output are hard to follow as they develop from parts to product and change their identity in the transaction, which is the usual conduct in general manufacturing, the base is invariably direct labor dollars, direct labor hours, machine hours, or tons of output.

Manufacturing Bases

Direct or productive material received
Direct labor dollars in total or by subdivisions
Standard direct labor dollars
Actual or standard direct labor hours by total or subdivisions
Machine hours in total or by subdivisions
Physical units of measure (pounds, tons, etc.)

Sales and Administrative Bases

Total net sales
Number of transactions
Units of sales (orders received)
Number of sales calls made

The combination of these and other bases will be determined by the rules of practicality, tolerance of error, and required sensitivity of control. Judgment must be weighted by the cost and time delay involved in getting varied detail facts to support any one base.

Sales as a Basis for Control. With a background for understanding the requirements of several bases used in breakeven control, it may be well to discuss the breakeven master base—sales dollars—for a moment in greater detail than covered at the beginning of this chapter.

For several reasons it is only natural that the sales or shipment dollar should be the most common base factor in use:

1. The sales dollar is the most common measure of business activity and the final coordinating element in profit determination as reflected on a profit and loss statement.
2. Since all subdivisions of statistical fact used in the average business are a segment directly or indirectly related to the shipment dollar, the final base of sales dollars provides the best common denominator for the summarization of all bases which are used.
3. Sales are usually recorded in detail and are audited and checked, at least unofficially, constantly. Sales as unofficially developed are used with the minimum amount of change in the financial records for both interim and audited financial reports. Therefore sales are more apt to be a clear and factual expression of value understood by top management where control lies.
4. The sales dollar is understood because it has a common meaning to the heads of all functional departments: sales, manufacturing, service, and executive.

Why the Sales Dollar Cannot Be Applied Effectively to All Departments. As stated in the requirements for a good base, the sales dollar does not always measure closely enough all the business activities. Direct or productive labor is usually a better base for setting variable costs in a factory because:

1. It is understood by the men who control segments of manufacturing expenses.
2. It is visual because it represents tangible, productive workers.
3. It is readily obtainable as an essential of the accounting process of functional classification.
4. It can be related to the master base with positive correlations after reconciliations of inventory fluctuation.

These are basic reasons why the factory cannot use the sales dollar for a basis of cost control even though productive labor sooner or later becomes shipments. The delayed action between direct labor and shipments prevents directly relating labor and sales. Increases or decreases in inventories reflect production schedules of activity at rates different from those of shipping schedules. The basic rule controls: to be effective, a base factor must be current and must express why the money is spent.

This brief comment does not cover all the conditions which may arise in the use of the sales dollar as a basis for the control of costs. Some of these conditions will be discussed when we are dealing with the character of the standby and variable elements in cost determination. If one keeps in mind the characteristics of the sales-dollar base as a factor which represents why money is spent, most of the difficulties in base understanding will be resolved.

Setting Standbys and Variables to the Base. Once the bases to be used in the detail control are selected, the job of building time and breakeven control is the job of relating all subsidiary costs to the base selected in order to determine specific standby and variable relationship to the base selected. In doing this many difficulties arise which will be more fully discussed later. However, in summary, these distortions are caused by

1. Input and output rate distortion
2. Poor accounting practice or poor cost records
3. Dishonest or incorrect historical figures
4. Accounting adjustments between interim and end-of-year periods
5. Lags due to indifferent or slow cost control

All these distortions except the fifth are usually found by an audit of the detail figures under study, but *lag* is not so easily spotted. The effect of lag in cost control has been touched upon, and in later chapters the effect of lag in distorting the trend of variability in scatter charts will be dealt with in still more detail. May it suffice to emphasize: the more remote the base from the actual reason for spending money, the more *lag* in cost control is likely to develop and the less accurate the base is likely to be in determining the *time* segregation of standby and variable elements of cost. If wild variations are found in any base or if the base fails to correlate with the master base, it is dangerous to use the base. The error must be sought out and corrected or a base with more stable relation to the master base must be used to determine the *time* components.

Determination of Variable Costs. While standby and variable cost components are determined simultaneously, we shall discuss them here as though each had a completely separate identity and existence.

In determining a variable cost we refer to the slope of its charted relation to volume; its acceleration or deceleration according to volume of activity increases or decreases when related to a base (reason for spending money). We illustrate this "slope" in Chart 18.

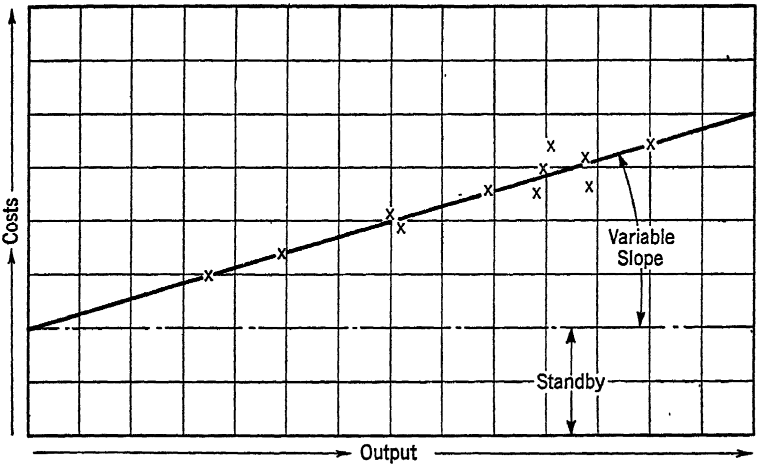

Chart 18. Scatter chart.

Variable costs are the costs which can be directly controlled according to the *volume* or degree of activity as measured in base activity dollars. Dollars for direct material, production workers, or commission salesmen are needed only when there is something to produce or sell, and thus they vary almost in direct proportion with fluctuations in the base.

Control is more easily maintained in *variable costs* because of this direct relationship of expenditures to needs as measured in base units. Control, however, depends upon management's ability to manage, upon judgment, and upon insistence that *lag* be reduced to a minimum. Control also depends greatly on ability to visualize running results in breakeven standards set as goals without being lost along the way or confused by changing volume and unexpected internal and external problems.

Use of Variable Costs in Running Management. The easiest way to solve a running problem is to relate it to planned variability denuded of undue time lags and then make a decision specifically directed at the isolated variations from normal variable slope.

Control of variable costs in any business should be used and can be just as positive as that exercised in seeing and controlling the variable costs of operating an automobile (used as an illustration in Chapter 5). Gasoline and oil are variable costs, and the efficiency with which they are expended is as positive as the driver's understanding of the effect of speed upon gas mileage and other factors of good driving, all of which he has under his control. This control is *positive* at every moment, because removing the foot from the accelerator reduces speed and is a positive way to increase gas mileage and efficiency. In business, control is just as personal and positive in a plant or in a sales or engineering department, at least so far as *variable* costs are concerned.

Semivariable Costs. There is further confusion in the approach to *time* segregation of costs because some costs are referred to as "semivariable." Any specific cost can have elements of variable to volume or standby to *time* varying in shading from 99 per cent standby to 99 per cent variable. Scatter-chart determination means seeking out this relationship.

In the case of the car, the battery wears out because of time as well as of miles run; therefore battery cost is a combination of standby and variable costs. During the war, normal depreciation, usually considered to be the most inflexible of standby costs, took on a variable nature because of extra shifts of production, resulting in special amortization because of extreme usage. It would not have been unrealistic to classify this excess of depreciation over normal as a variable cost with the result that the total depreciation would be both standby and variable in cost standards.

The important point to remember is that costs vary from two extreme shadings. Some are highly inflexible or long-term in nature; others range to highly variable (short-term controllable) with output. In between the two extremes, costs create a complete spectrum of *time* sequences. These relationships must be determined in each company for each department, each account, before the control of costs is real and before breakeven points have significance. Do not be confused, therefore, if scatter charts show both variable and standby components. Most of them in a normal business should show this mixed composition.

Standby Costs. Standby costs (sometimes referred to as "fixed" costs) are those costs which do not (because of organization, physical layout, management thinking, executive decision, poor control, lack of capital availability, etc.) change readily with volume in a going concern. The standby that is determined by scatter charts is a mathematical condition at zero base. Since no company works at zero base unless shut down, this standby is primarily an arithmetical description of a portion of the total expense. The true minimum standby in any company, therefore, would be this zero or no-base standby residue of expense plus the variable that accrues to the minimum base that would be possible for any sustained period in a going company.

Illustration: Operating Standby Costs. To illustrate, suppose the mathematical zero standby to be $1 000 000. If the variable were $0.70 and management felt that the lowest probable volume would be $3 000 000 or 30 per cent capacity, the real minimum operating standby is the $1 000 000 at zero plus $0.70 variable on $3 000 000 output, or $3 100 000 of costs. This aspect of standby has differing significance depending upon whether one is considering an operating, liquidating, or shutdown situation.

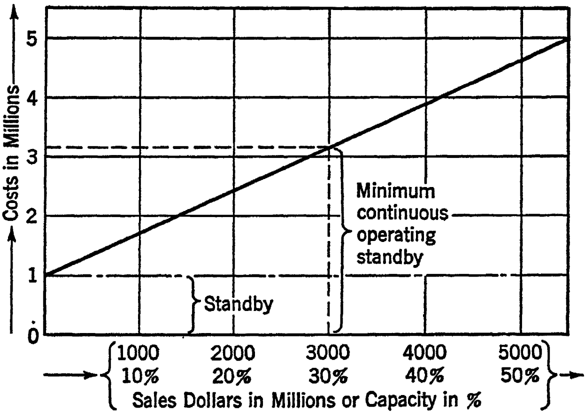

Chart 19. Standby costs.

Variation of Standby with Base Used. Standby will vary when the same costs are measured against differing bases. The more intangible the base and the more remote from actuality of activity, the more uncertain the standby relationship. Ordinarily the amount of variation in the residue caused by this condition is minor when proved standby allowances are added together and compared to the apparent over-all standby obtained by using the sales dollar as a base. Again it is a problem of intelligently weighting the pros and cons of the ease of obtaining the base, the degree of error which may accumulate, and the ability to convert to a master base.

Determining Time Costs. To determine *time* costs it is necessary to spell out the *why* of business, then to select the correct base, and then to measure costs to this volume (base) or function. Trend lines against several bases can be tested before operating standards of composite standbys and variables are presented for management acceptance.

In many instances cost control has lost its punch because management has tried to "eat its cake and have it too." Management may complain of too high a breakeven point, but nothing is done to tighten standards, to reduce costs, or to correct the detailed standby and variable factors which make up the composite breakeven point. *The purpose of any control system is to control segments to a summary and from the summary back to segments* without blind alleys and unrelated details cluttering up the process. There is no better way known today in management techniques than the use of representative standby and variable standards which recognize the impact of *time* in costs and which support the over-all breakeven point. If management thinks the breakeven too high, then the detail factors are too high and vice versa, for one is the other in substance.

Plotting of Time Factors. There are, in general, two types of *time factor* determinations, which will be discussed individually. These are:

1. Determination of time factors based on past experience by the use of scatter charts. This is used by companies with satisfactory cost histories.
2. Determination of time factors in a new company or in a new

segment of an existing company where the past cost history is not a criterion of the proposed or planned operations.

Determination of Time Factors Based on Demonstrated Past Experience and Ability. Dependence upon demonstrated ability in the past is by far the most common method and satisfies well over 90 per cent of the situations. Even when selected factors are sought which will be a material improvement over anything done in the past, it is customary to start with the results of the past. In the process of investigation, elimination of the faults of the past as they expose themselves on the cost "scatters" may be planned, accounting errors recognized, and distorted or uncontrolled elements of past costs isolated. Using the past as a mirror for the future has the advantage of coordinating the existing and past results. The necessary planned reductions can be related to present practices in specific detail.

Drawing Scatter Charts. Trend or "scatter" charts based on past experience are more readily understood by the working organization and accepted as factual evidence more readily than someone's theoretical concept of what costs should be. Usually operating organizations will accept reductions based on demonstrated ability in their own past history and will set stiff goals for themselves if the goal reductions are derived on scatter charts which portray past performance.

The technique of building scatter charts was explained in Chapter 5.

Establishing Standby and Variable Factors in a New Company. A "new-company" situation presents itself when there are no past records, when the past is radically unlike the present in physical structure, or when there is lack of confidence in past figures available. Standby and variable factors can be developed by other methods.

The most common method is to plan costs at three diverse levels of productivity or output base. This is usually done, assuming low, medium, and high activity levels or output, as follows:

1. Determine sales or output in units at three ranges of capacity: 30, 60, and 80 per cent probable capacity. These levels may represent one, two, or three shifts, depending upon the

nature and practices of the business in question. It is a relative thing. The relationships desired are of three levels of activity which are entirely probable and within the range of experience or imagination.

2. Determine the base values at these three activity levels.

3. Estimate all other costs as they relate to the base at each of these levels independently of each other.

4. Plot the three points on a chart similar to the scatter graphs in the usual, historical method explained previously.

5. Draw the line of best fit to determine the standby and variable amounts.

6. Consider the validity and feasibility of the management tasks derived from the aggregate of the slopes of the lines.

Illustration:

1. A company has a capacity of 1 000 units per month.

2. Its normal working range is between 400 and 900 units on a one-shift basis (two shifts in several bottleneck departments with high capital or equipment requirement).

3. The direct labor hours are 10 hours per unit of output. Thus,

At 40 per cent capacity, 400 units require 4 000 productive hours
and at 70 per cent capacity, 700 units require 7 000 productive hours
and at 90 per cent capacity, 900 units require 9 000 productive hours

These productive hours cost $1.50 per hour for direct labor. A study of other costs at each level indicates that at 4 000 hours, it costs $6 000 for indirect labor, maintenance, fixed charges, and other indirect costs. Similarly, at 7 000 hours this cost is found to be $9 000, and at 9 000 hours, it is estimated at $11 275. When these are recorded on a scatter chart, the results are as shown in Chart 20.

These costs, plus the productive direct labor of $1.50 per hour, plus the productive material not included determine the standby and variable relationship to the base for all costs. This process should be worked out in detail by account subdivisions and by

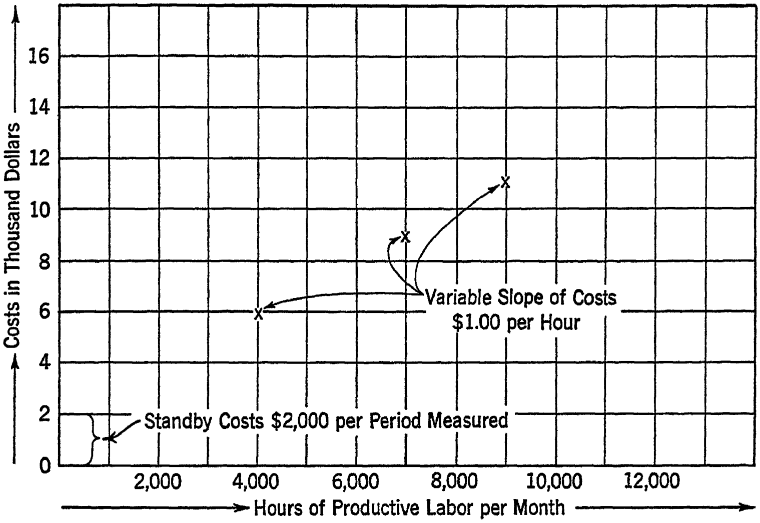

Chart 20. Standby and variable costs for a new company.

departments, the detail depending upon the precision of control needed in the new company.

Advantages of the Scatter-chart Method. While this method of establishing *time* cost factors must be resorted to at times, it is infinitely better to establish standby and variable factors from past history. This does not mean goals cannot be set "tighter" or better for the future than past scatters indicate. An organization usually responds better to goals which spring from past performance even if the organization is expected to better those past results. There is usually a feeling in the organization that when the future is based on the past, it has a tangible substance. When goals are based on synthetic factors, it is theory. Thus, improvement of past performances for the standby and variable determination is recommended whenever cost history is available.

Do Not Let Past Lag Produce Loose Factors. A word of caution about past-experience scatters. If there has been no real cost control in the departments which spend the money, any standards based on scatters of the past can be excessive. In a number of cases, scatters have been set too high because the past history is so full of lags. Well-made scatter charts expose lag, and most supervisors are not opposed to reducing the factors for future periods, especially if the improvement is recorded so that the source of the improvement can be noted by a satisfied management.

Many companies over a 10-year period have reduced their costs through constant "tightening" of the breakeven time factors by 10 and often as much as 25 per cent. This improvement, after all, is the reason for wanting to control costs in the first place. The advantage lies in the method—standby and variable subdivisions of costs which provide a positive improvement measure on the summary or master profit recorder—the breakeven chart, which cannot be fooled as it measures the net composite of results, good or bad, on profit potentials.

Establishing the Standby and Variable Trend Lines. The cost or trend line which results from plotting may be set in with a transparent guide, ruler, or triangle. The trend should be drawn across the chart through demonstrated feasible performance indicated by the plotted points with as little variation from the norm as possible. Sighting by eye gives full play to all the supporting interpretive analysis of the history portrayed in the chart.

The resulting cost-trend line will show the following:

First, measured on the vertical scale at the left will be the standby or time expense which is incurred in the department for the term of the plotted individual accounting periods. This does not mean the standby cannot be reduced, but it does mean this is the amount which, by past experience and by existing control, does not alter with changes in volume. It is the residue or basic amount required to support a going company.

Secondly, the slope of the line will indicate the *variable* expense or increment cost in proportion to the increases in volume. For instance, if a variable cost is $0.45 per $1 direct labor, this means that the trend line shows an average increase at a rate of $0.45 for every dollar of increased direct labor (base). If the slope of the line drawn through the point were measured between any two points, the change as measured on the vertical scale would be $0.45 for every dollar of increase or decrease in the base.

Operating Standby Is Not Zero Volume. For mathematic reasons, to be able to tie in all details, and to support breakeven points, standby is expressed at zero volume. Truly, this standby is actually the residue or remaining cost if the variable slope is carried to the end of the chart.

The true standby is this residue plus the variable slope of costs to minimum capacity which represents volume below which the company in question would not fall and long remain open. To illustrate: Company A would not expect to stay open below $1 000 000 net sales per year, which is 27 per cent of capacity.

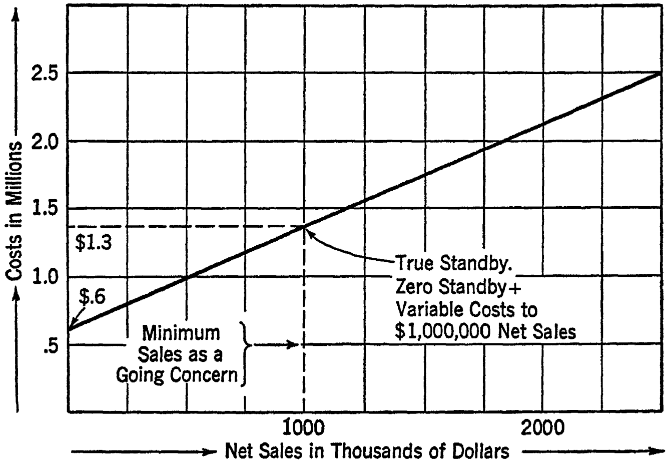

Chart 21. True standby costs illustrated.

Their standby costs at zero on which the breakeven is based are $600 000 per year. Their variable costs are $0.75 per $1 net sales. Thus: $1 000 000 × $0.75 = $750 000 + $600 000 = $1 350 000, the lowest costs for operating as a going concern. At this point the company would lose $350 000 per year.

In each company this minimum point will depend upon management decision, time cycles, availability of funds, and other similar conditions which vary with the times.

Conclusion. While figures are nothing but a recorded evaluation of what has happened or what will happen, they too often are so weak in the ability to focus and evaluate what they attempt to measure that they have created in American industry too many "hobbyhorse" managements. It is this simple: profit understanding comes with an understanding of the following: (1) mix of product to normal mix; (2) volume of business; (3) performance on any given volume. These are not clear facts without standby and variable costs which detail and support breakeven points. They are the H_2O of costs. There is nothing herein which is more than a refinement and interpretation of the figures now in use. The new ingredient is the weighting and evaluation of time or turnover in values. There is no mystery in the use of dynamic cost factors unless one chooses to make some mystery.

CHAPTER 9

DETERMINATION OF CAPITALGRAPH FACTORS

Introduction. Of the companies using *standby* and *variable* cost factors in planning and controlling costs, few apply the same principles to the financial side of the business. It is just as important to know the capital requirements and the probable return on investment at all levels of business as it is to know the rate of profit on sales. In fact, the use of capitalgraph and breakeven philosophy together give new insights into the relationship between profits on the one side and good housekeeping in balance-sheet appearance on the other.

As a matter of fact, decisions which have "long-range" effect upon costs, and from which stem many irreducible standby costs, cannot be given adequate consideration unless the interwoven financial problems as reflected on the balance sheet are also segregated into their standby and variable factors.

Applying Dynamic Thinking to the Balance Sheet. Development of these dynamic thought processes is no more difficult in the case of capital requirements than in breakeven determination, at least so far as working capital is concerned. It consists of analyzing the elements of the balance sheet, using scatter charts of past performances. Like costs, capital requirements include two elements:

1. *Float.* Similar to breakeven standby, float is the amount of money required to "get into" business, or the minimum necessary to maintain a "going" business in a position to serve customers. This amount of cash, inventory, plant, and other types of asset is the minimum cushion needed to support the start of the turnover process on the historical scale of activity.[1]

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[1] Float—Inflexibility of cash due to minimum balances between banks, transfer periods, and basic protection against weekly payrolls causes a

2. *Variable Capital.* For every dollar of output, a business needs working capital over and above *float* capital. This volume requirement is governed by rate of turnover, type of credit, seasonality, out-of-pocket cost content of product sold, breakeven point, etc.

Together float and variable factors determine the capital requirements of a business in response to swings in activity. *Float* actually required will change with abnormal or capacity expanding expenditures for plant and equipment. Working capital float requirements may also change with practices in cash-deposit distribution, credit and collection, inventory control, and the like as they reflect themselves in better or poorer day-by-day management in the problem of turnover of the capital at work. *Variable* capital requirements will fall as operating management learns to produce with shorter material lead times and shorter manufacturing cycles. Conversely, variable requirements will rise as management chooses more "comfortable" inventory practices, allows its customers more generous collection terms, or takes on problems such as regional warehousing and similar methods of operation which break or slow the turnover cycle.

As with the breakeven point, the direction, nature, and magnitude of change in capital requirements are of primary managerial significance. A base line from which to measure is needed; the pattern of the past must be known to formulate a plan of capital management for the future.

Determining *Time* of Capital Items. Determination of the *float* and *variable* capital requirements employs the same principles of scatter charting that were used in determining standby and variable factors to support the planned breakeven-point cost structure. The periodic or monthly *annual* rate of output, however, is the basic measure of output, not the monthly amount. In this respect lies the essential difference from the plottings of cost data.

The very nature of the balance sheet as a cross section of posi-

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standby or float in cash; slowing up in accounts receivable when business drops off, as well as the effect of unbalanced inventory caused by minimum quantity of a wide variety of parts and similar uneconomical conditions, are typical illustrations of "float" characteristics found in capitalgraph determination.

tion at a given point in time suggests this procedure. Capital requirements are a resultant condition expressed in the balance-sheet items. The cost items used in expense and profit control charting are expressions of cumulating time and activity.

Correct procedure, therefore, requires that the chart base measure of output be annualized. The respective monthly balance-sheet items are then plotted against this annual rate base. Were the values of the balance-sheet items plotted on monthly output as a base, the apparent variable trend rates would be the twelfth root of the correct values. The compounding of interest effect is properly compensated for by annualizing the base.

Capitalgraphs Look Different by Industries. Capital requirements vary between industries, depending upon many factors of which the following have the most influence:

1. Type of business (high or low capital investment per sales dollar)
2. Length of productive or distribution cycle
3. Turnover caused by:
   - *a.* Capital policy
   - *b.* Capital performance
   - *c.* Customer demands

A steel mill is a type of business which, by its nature, requires a large investment in furnaces and other fixed assets. The "rent" or "buy" alternative, depreciation policy, and other things give management control within limits. Two identical steel mills with identical sales volumes might, however, require differing amounts of capital, depending upon another factor—capital turnover. Management alters capital turnover by its decisions on how to buy, how to sell, and how to operate, which are capital policy. Even where there is identical capital policy, there is still the test of execution, that is, capital performance. The steel mill whose management performs best (comes closest to meeting their capitalgraph formula day in and day out) would require the least amount of capital or, said in another way, could get more sales from the same capital.

Wisconsin Manufacturing Corporation Capitalgraph. Suppose that scatter charts of the balance-sheet items have been made, and trends selected for an enterprise which we shall call Wisconsin Manufacturing Corporation. The capitalgraph factors

TABLE IX. CAPITALGRAPH FACTORS

WISCONSIN MANUFACTURING CORPORATION

	Basic or yearly float capital *	Variable capital needed per $100 annual rate of sales
Current assets:		
Cash	$ 50 000	$ 3.35
Accounts receivable	50 000	8.06
Inventories	150 000	12.66
Total current assets	$250 000	$24.07
Current liabilities:		
Vender payables and working expenses accrual	75 000	7.06
Working capital, net	175 000	17.01
Net land and plant assets	625 000 †	2.35 ‡
Net total operating capital required	$800 000 §	$19.36 §

* In calculating capitalgraph scatter charts, it is customary to use the annual basis because the balance sheet from which the information is derived is thought of in terms of annual conditions. Furthermore, the breakeven point to which the capitalgraph is coordinated is usually considered in its final form on an annual or audit basis.

† Executive decision can change the plant account float practically overnight. Examples: additional land for employee parking; new building (office, warehouse, expansion of capacity).

‡ Variable for plant assets *plus* depreciation accrued assumes spending depreciation to maintain capacity plus technological advance of the equipment complex. It may or may not be sufficient to keep in step with replacement price levels.

§ Sources of net total operating capital requirements:

Net worth as commonly reported on the balance sheet inclusive of capital stock and retained earnings or surplus.

Borrowings whether in the form of bonds, debentures, notes, or bank loans, long or short term, even though accounting practice may require their classification among current liabilities.

Federal and state income taxes accrued and not yet due even though accounting practice requires that they be listed as current liabilities.

Borrowings other than perpetual debentures and taxes on income are time-restricted sources of capital since the payment dates are rigidly fixed. Their characteristics will be discussed later in the chapter.

(capital requirement pattern) would be summarized as given in Table IX.

In summary, Wisconsin Manufacturing Corporation needs $800 000 plus $19.36 per $100 efficiently to handle its sales program within its plant capacity, over the long term. At the risk of impinging upon its inherent capacity, its financial management can limit plant replacements to the extent of depreciation charges. Blocking off $2.35 per $100 for plant requirements will reduce the variable operating capital requirement to about $17 per $100.

To demonstrate how the capitalgraph explains capital requirements, let us suppose that Wisconsin Manufacturing Corporation has broken even at annual sales of $2 110 000 and that management is forecasting sales for the following year at $4 000 000. If the operating schedule calls for 242 working days a year, these volumes represent daily billing rates of $8 720 and of $16 530 respectively. Table X details the application of the capitalgraph to these sales volumes and reduces the balance-sheet values to approximate equivalent days of billing.

The indicated operating capital requirement to support an annual rate of $4 000 000 is $1 574 000. If there is any deficiency, to that extent the projected volume of $4 000 000 is impossible without borrowing or otherwise obtaining additional capital. It is true that for very short periods of time an organization can force its working capital situation and make temporary surges in output. This is done by slowing the payment of trade accounts due, by temporarily reducing inventory to increase turnover, by speeding collection of accounts receivable, and by leaning heavily on tax accruals. It must be reiterated, however, that a company which does not have sufficient working capital to do an additional volume of business (which in Table X is $365 904 more at $4 000 000 sales than at $2 110 000 annual sales) cannot walk this tightrope for any sustained period of time. The problem is further complicated when additional volumes come in unequal surges. This refers to an average rate of $4 000 000 a year with half of the year being at $6 000 000 rate and the rest of it at less than breakeven. Of course the operating capital required at breakeven may be something less than the net worth of the company. But such excess net worth will be useful in handling so sudden an increase in sales volume only if it is in working capital and not tied up in plant investment. Or it may be that profits

TABLE X. APPLICATION OF CAPITALGRAPH TO SALES

WISCONSIN MANUFACTURING CORPORATION

Item	Amount	Days of billing
Requirements at breakeven volume of $2 110 000 net sales		
Cash	$ 120 685	14
Accounts receivable	220 066	25
Inventories	417 126	48
Total current assets	$ 757 877	87
Total current liabilities	223 966	26
Working capital	$ 533 911	61
Plant assets	674 585	77
Operating capital required	$1 208 496	138
Requirements at $4 000 000 net sales		
Cash	$ 184 000	11
Accounts receivable	372 400	23
Inventories	656 400	40
Total current assets	$1 212 800	74
Total current liabilities	357 400	22
Working capital	$ 855 400	52
Plant assets	719 000	44
Operating capital required	$1 574 400	96

from the sales above the breakeven point will be sufficient. We find our answer to this possibility in the profitgraph.

Seed Money. Any company which is operating above the breakeven point can, through retained earnings, secure additional capital for expanded operations in the future. However, few companies are in the fortunate position in which the rate of profit per $100 of sales materially exceeds the variable capital requirements per $100 of sales. In theory, at least, this fortunate situation would allow infinite expansion out of retained earnings. This lack of ability to build up working capital from profits is apparent in an analysis of industry groups.

Capitalgraph vs. Profitgraph. The significance of the capitalgraph comes into focus in a comparison with the profit potential of the enterprise. The profit potential is the resultant of the profitgraph factors, which, for Wisconsin Manufacturing Corporation, are given in Table XI.

TABLE XI. PROFITGRAPH BREAKEVEN FACTORS

WISCONSIN MANUFACTURING CORPORATION

	Annual Standby Cost	Variable Cost per $100 Net Sales
Direct labor		$10.80
Direct material		46.80
Factory burden	$294 000	12.10
Total cost of sales	$294 000	$69.70
Selling and administrative expense	184 500	7.65
Total costs before taxes on income	$478 500	$77.35
Marginal or potential profit before taxes		22.65 *
Annual breakeven sales volume	$\frac{\$478\ 500}{0.2265}$	= $2 110 000
Operating capital requirements	$800 000	$19.36

Capital required at breakeven:

$800 000 + (0.1936 × $2 110 000) = $1 208 500 (see p. 83)

* Net after taxes per $100 of sales above breakeven. At various tax rates:

At effective rate of 48%	$11.78
At effective rate of 50%	11.32
At effective rate of 52%	10.87
At effective rate of 55%	10.19
At effective rate of 54%	10.42

During the year 1954 Congress acted on Federal tax rates for corporations by reducing them materially. It would appear that the economy is in a cycle of changing income-tax rates which could take varied forms in the next several years. Each company's rate varies slightly and is confused from a standard by both state and Federal profit-taxing problems. To reduce complication this text uses an average of 50 per cent, first because it is easy to visualize as half of the profits available for taxes and second because it represents approximately the average of present taxing policies. Each person working with the capitalgraph and the factors therein and with the coordination of the capitalgraph and the profitgraph can alter the tax calculation to fit his own situation.

Since the variable operating capital requirements in our illustration are $19.36 per $100 of sales, the net after taxes at an assumed 50 per cent effective tax rate falls short by $8.03 per $100 sales ($19.36 less 50 per cent of $22.65, the profit pickup above the breakeven) of generating full capital requirements. The significance of deficiency will be disclosed by further analysis.

Evaluating the Effects of Volume Changes on Operating Capital and Profits. These cost factors indicate that at $2 110 000 the Wisconsin Manufacturing Corporation breaks even, and above that point, profits before taxes accrue at the rate of $22.65 per $100 of sales. But Federal and state taxes on all profits above the breakeven point reduce the true profit-pickup amounts to $11.33 per $100 of sales on a 50 per cent tax assumption.

The analysis gives the facts for these conditions:

I. Above the Breakeven Point on Increasing Sales	Variable Rates per $100 Sales
Operating capital requirement from capitalgraph factors of float plus variable	$19.36
Profit productivity before payment of dividends, net after approximately 50% tax rate	11.33
Variable capital deficiency which must be raised. For short periods of time this deficiency is not always noticed because of tax reserve offsets, or capital available, but for permanent and sustained volume growth, the deficiency must eventually be met unless specific ways are found to improve capital turnover	8.03

II. Above the Breakeven on Falling Sales	Variable Rates per $100 Sales
Operating capital released as sales fall, per capitalgraph factors, variable portion	$19.36 *

* If capital projects were too far along to discontinue quickly, working-capital variable of $17.01 might be the measure of capital release.

Note: While profits are also reducing (at the rate of $22.65 until the breakeven point is crossed) actual losses will not be sustained unless *lag* (discussed in Chap. 7) causes the breakeven point to rise toward a "meet" with falling sales. Where this occurs, the rule which follows, "Below the Breakeven Point," will apply.

III. Below the Breakeven Point

Losses are incurred at the breakeven factor rate. This assumes management ability to hold the planned variable cost rate which supports the breakeven point of $2 110 000 net sales per year on the down side. Lag may appear to cause unexpected losses over and above the planned rate	$22.65
Working capital capitalgraph rate of operating capital released	17.01
Variable capital deficiency to be made up	$ 5.64

Notes: Ordinarily investment in plant usually tapers off abruptly when a company goes into a loss operation. It must continue to carry, however, the accumulated plant-investment need at the tops of its sales curves until time and the depreciation rate begin to return accrued depreciation to cash.

Sources of offsets to variable capital deficiency below the breakeven point are these:

1. Reduction of variable costs at rate greater than profitgraph task rate. This is rarely accomplished.
2. Elimination of standby expense through realignment of organization structure. This requires courage and clear-thinking action.
3. Excess of depreciation charges over plant replacement rates.
4. Tax "carry forwards," which are available only for definitely limited periods and amounts.
5. Borrowings from outside sources.
6. Accrual of reserve (noncash) at a greater rate than actual cost disbursements from the reserve.

Trading on Tax Accruals Appraised. It is evident that using tax accruals as if they were free working capital funds is not only a necessity, but a habit of present-day management. There is no question that unpaid taxes can be used to reduce short-term borrowing; on the other hand, this is a poor substitute for long-term borrowing and equity investment, particularly where there are in prospect abrupt upward swings in sales volume.

Fiscal needs of the Federal government are always a threat to such a policy. Business could suddenly find that the payment dates are again to be advanced toward a "pay-as-you-go" reality. Were it necessary to adjust to income-tax payment dates that would call for estimated payments in the third and fourth quarter of the business year, trading on tax accruals for practical purposes would be abolished. The amount of tax accruals being used to augment working capital would then be roughly the measure of additional net worth needed over and above present requirements.

With a weather eye on the tax climate, probably a safe course would be to trade consciously on no more than half of the tax accrual. That is, about half of the tax accrual should be funded at all times unless the variable gain above the breakeven point is at least 50 per cent greater than the variable rate of capital requirements.

Cost of Borrowing. In the illustrative alternatives just cited, it has been assumed that borrowed funds would be readily available. Neither have the figures quoted been modified to reflect the cost of the borrowing. To have done so would have entailed tedious calculations and explanations at the risk of beclouding the fundamental issue. Nevertheless, the effect of an interest payment on the cost picture should not be dismissed without comment.

Interest costs raise the effective breakeven point, just as does any other added cost. For example, if the operating capital deficiency at $4 000 000 annual sales required borrowings which produced interest of $8 000 a year, the breakeven point would increase approximately $35 000. Unless management is able to offset interest expense with other economies, to the extent of the added interest, the planned breakeven factors will not be realized. Whether the interest expense acts as an added standby cost or as an added variable cost depends upon the timing of the borrowing and its repayment.

Conclusion. As a general proposition, American industrial corporations have been profligate in their use of operating capital. Conservative dividend policies, years of easy profits, trading on tax accruals, and accelerated depreciation allowances have combined to conceal inefficiencies in capital management.

Lag in control of variable costs when volume falters or markedly falls off and an approach to collection of income taxes on a pay-as-you-go basis are upsetting the complacency of lush times. Out of the realization of the interplay of capital requirements and of profit potential will come more realistic attitudes toward capital tie-up in inventories and plant. The tax collector will not wait; default on or rescheduling of debt refunding damages future possibilities of seizing upon growth opportunities. Therefore there must be balance between profit-mindedness and balance-sheet-mindedness.

Coordination of the capitalgraph and the profitgraph instruments gives the basis for comprehensive and balanced managerial decision.

CHAPTER 10

COORDINATING PROFIT POTENTIAL AND CAPITAL REQUIREMENTS

Introduction. The previous chapter explored the field of capitalgraphing and described its mechanics.

This chapter deals with the several methods by which the capitalgraph and profitgraph may be used to coordinate the financial stories of the profit and loss statement and the balance sheet, the prime summary statements of management.

Breakeven and capital coordination are newer techniques of management.[1] Each represents its own static accounting summarization. The breakeven coordinates and makes dynamic the profit and loss report, while the capitalgraph performs the same function in balance-sheet techniques. Together they record the interplay between these two fundamental statements. Because they are both dynamic they provide a constant relationship between the two functions of measuring values. Like a set of gears, their action flows, motivated by the direction of a common force. The use of these two synchronized media gives management new insights into the old problem of profits vs. capital or capital vs. profits.

The profitgraph reveals the potential profits or losses at all levels of output. The capitalgraph shows the money required to serve the various levels of sales activity. When the two are used together, provided that the underlying statistical facts are synchronized, they reveal the balance or lack of balance between operations and capital available. With positive coordination comes more sophistication in management, and sharper decisions on problems of management as they relate to *time.*

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[1] American business has not generally used either breakeven points or capitalgraphs to the fullest extent. This is especially true of capitalgraph techniques. Some of the early thinking on this subject can be found in works by C. E. Knoeppel and Edgar C. Seybold published by McGraw-Hill. The author published numerous articles on the fundamentals of this subject between 1924 and 1941.

"At what rate of sales can we produce a fair return on net worth after taxes?" This question goes to the core of the interplay of profit potential and capital availability in management thinking. The data of Table XII and the coordinator chart (Chart 23) show how this question can be reduced to a formula on a given set of facts. If the "facts" also represent an operating plan, management has full grasp of its financial problems.

Coordinating Breakeven with Capital Requirements. Using the factors of float and variable for capital, and the breakeven factors of standby and variable which support costs, the *coordination* of capital and breakeven requirement measured by return on investment and profit percentage is simple. One can then determine the following at various sales levels:

1. The total investment required
2. The profit task (a selected rate of return on operating capital) expressed as a per cent of profit required in sales
3. The total of all costs
4. The net profit after provision for taxes
5. The profit possibilities expressed as a per cent of sales

In statistical form these findings take on the appearance recorded in Table XII. Other factors such as turnover rate expressed as number of days of billing can be added to the schedule for individual presentation. The important fact remains that with a breakeven plan coupled with capitalgraph factors the weighting of profitability and capital required is a visual story and simple of presentation.

Such a procedure gives decision management a quick audit review of the breakeven, the capitalgraph philosophy, and the coordinated evaluation used for policy guidance. It is the springboard for forecasting a future period. If the projected results make the decision men uncomfortable, or appear to be unsatisfactory, it is of no use to forecast tomorrow in detail. The overall profitgraph breakeven and capitalgraph planning should first be adjusted to produce acceptable operating goals.

For example, our illustrative company needs more than $4 000 000 in sales to coordinate management's objectives for profit and capital (see line G, Table XII). One's eyes cannot be closed to sales and working capital requirements—nor to the return expected from investment. Yet usual static methods of analysis encourage management to do just that.

TABLE XII. TABLE OF COORDINATED INVESTMENT COSTS AND PROFITS
WISCONSIN MANUFACTURING CORPORATION

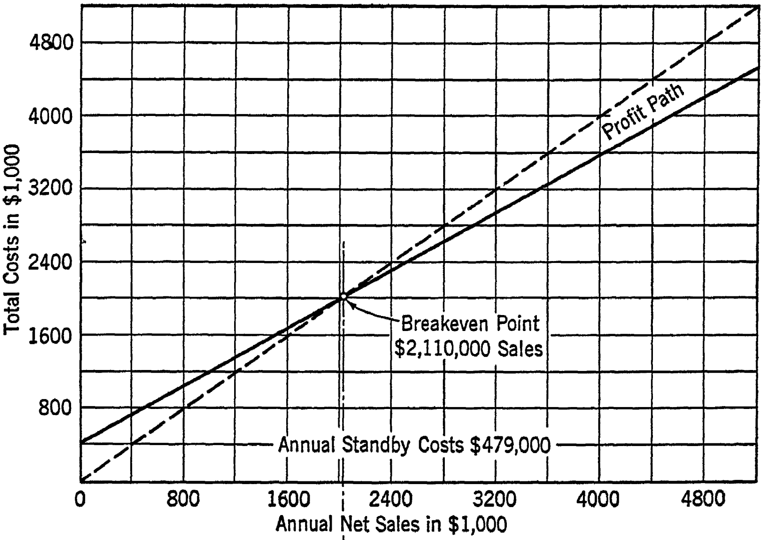
(000 omitted)

Fixed net worth (1)	Variable net worth (2)	Total net worth (3)	% profit required to produce 10% return (4)	Annual net sales (5)	Annual stand-by (6)	Annual variable costs (7)	Total all costs (8)	Profit before taxes (9)	Estimated income taxes at 50% (10)	Net profit after taxes (11)	% of net profits in sales (12)
(A) $800	$ 310	$1 110	6.9	$1 600	$479	$1 236	$1 715	$115 *	...	$115 *	7.2 *
(B) 800	387	1 187	5.9	2 000	479	1 547	2 026	26 *	...	26 *	1.3 *
(C) 800	464	1 264	5.3	2 400	479	1 854	2 333	67	$ 34	33	1.4
(D) 800	541	1 341	4.8	2 800	479	2 163	2 642	138	79	79	2.8
(E) 800	619	1 419	4.4	3 200	479	2 474	2 953	247	124	123	3.8
(F) 800	697	1 497	4.2	3 600	479	2 782	3 261	339	170	169	4.7
(G) 800	774	1 574	3.9	4 000	479	3 094	3 572	428	214	214	5.3
(H) 800	851	1 651	3.8	4 400	479	3 403	3 882	518	259	259	5.9
(I) 800	929	1 729	3.6	4 800	479	3 713	4 192	608	304	304	6.3
(J) 800	1 006	1 806	3.5	5 200	479	4 022	4 501	699	350	349	6.7

* Indicates loss, deduction, or other negative figure.

The profit-task curve on the coordinator chart (Chart 23) indicates the per cent of profit required in sales to produce a 10 per cent return on operating capital (see column 4, Table XII). The budgeted profits curve reveals what per cent of profits after taxes may fairly be expected at 100 per cent budget realization. The point at which these curves intersect is the point at which the 10 per cent profit task is accomplished. In the case of the illustrated Wisconsin Manufacturing Corporation, this point is an annual sales rate of approximately $3 300 000.

Suppose the projected volume of the company for a forecasted year is $2 800 000 (line D). Then the coordinator chart indicates that the net profits after taxes will amount to $79 000 or 2.8 per cent (column 11) of sales, whereas the profit task is 4.8 per cent (column 4). Thus, less than 60 per cent of the profit



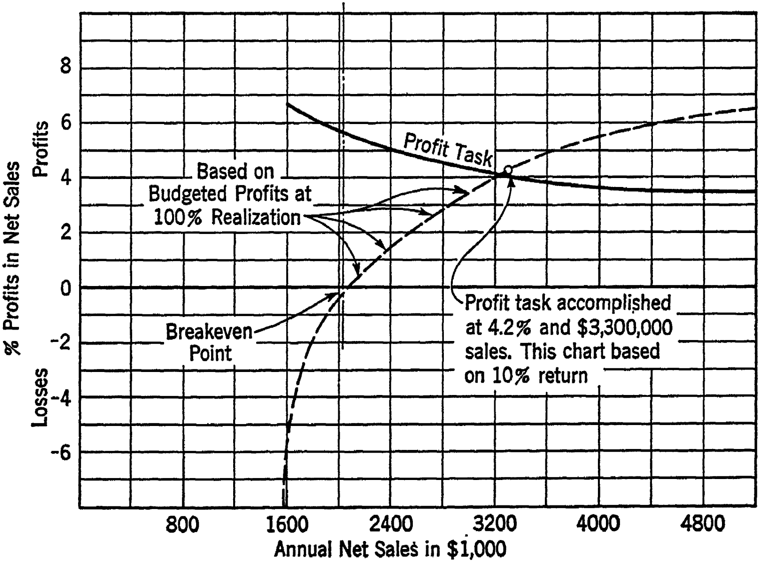


Chart 22 (*top*). Profitgraph chart (Wisconsin Manufacturing Corporation).

Chart 23 (*bottom*). Coordinator chart (Wisconsin Manufacturing Corporation).

task (10 per cent return on net worth) will be accomplished unless the breakeven point is lowered materially or the volume increased while maintaining existing breakeven efficiency.

The profitgraph and coordinator chart explained above are shown in Charts 22 and 23.

In the case of the Wisconsin Manufacturing Corporation, variable capital requirements to produce $100 of sales, as pointed out in the previous chapter, are $19.36, whereas the marginal profit after taxes is only $11.33 after approximately 50 per cent provision for taxes. The disparity between these amounts means that the company's growth from retained earnings alone is limited.

The investomatic profitgraph shown in Chart 24 has been drawn from both capitalgraph and profitgraph factors. It permits four cogent facts to be read simultaneously for all levels of activity:

1. The annual sales volume (lower scale)
2. The operating capital required to support this annual volume (upper scale)
3. The annual net profit after taxes or the net loss (left scale)

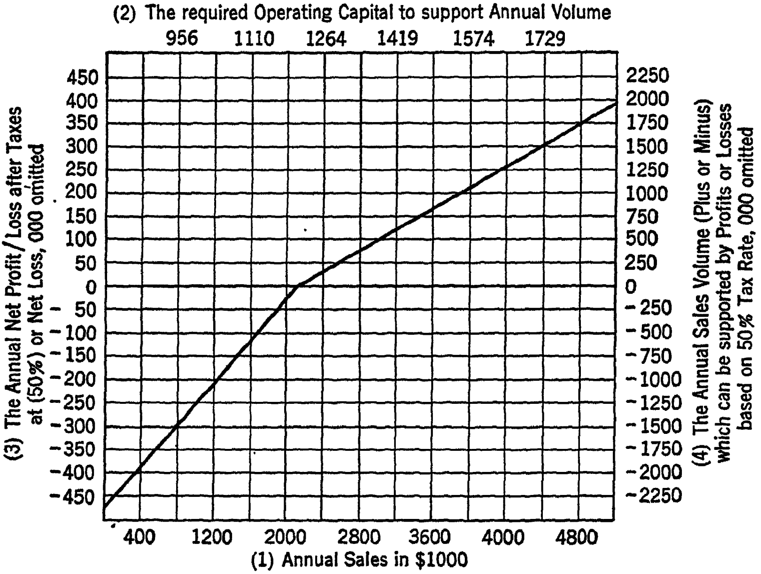


Chart 24. **Investomatic profitgraph (Wisconsin Manufacturing Corporation).**

4. The additional annual sales volume which could be supported if profits after taxes were not withdrawn from the business (right scale)

By way of illustration, the projected sales are $2 800 000 (lower scale). To produce at this rate, $1 341 000 of operating capital (upper scale) is required based on float of $800 000 and variable of $19.36 per $100 of net sales. Net profits after taxes will amount to $79 000 (left scale). If these profits of $79 000 are permitted to remain in the company, they could support an additional annual volume of approximately $408 000 (right scale).

Other information can be interpolated. If $40 000 of the net profits were paid out in dividends, the remaining profits of the company would support an additional annual sales volume of approximately $200 000.

The investomatic profitgraph chart should be drawn on a larger chart for accurate reading. This reduced illustration, however, demonstrates how these diverse relationships can be expressed jointly and graphically for quick management comparisons.

Balanced Capital Planning. To explore the idea of the capitalgraph further, the capitalgraph provides another example of the usefulness of breakeven thinking and control. Chart 25 shows the relationship between capital requirements and sales volume at one moment in the life of a business. Assets are assumed to be under perfect managerial control and supported by a definite capitalgraph.

There is a point in annual sales volume at which working capital is fully employed, capital turnover is high, and earnings on capital investments are good. Above that point is the area of working capital deficiency and growing pains. Below that point is the area of idle capital and usually poor earnings. Within the normal range of activity of the business the relationship between capital requirements and sales volume approximates a straight line which can be graphed as above or formulated for the company as an operating capital rate on sales (e.g., $19.36/$100 of net sales).

Capital Deficiency with Sales on the "Upside." A profitable business using all its capital to expand sales volume can allow itself a calculable growth out of retained earnings. If enough time is allowed, any conceivable sales volume could be financed.

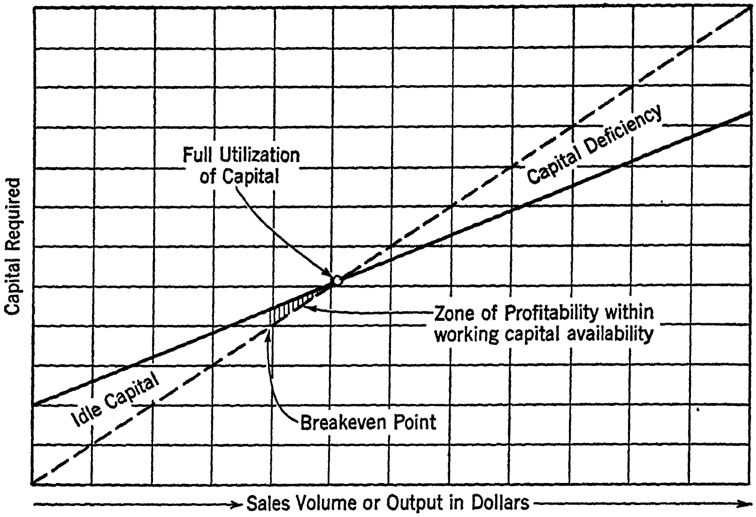


Chart 25. Chart of capital utilization.

Time is the limiting factor. For the Wisconsin Manufacturing Corporation, the annual growth factor is calculated as follows:

Capital requirements per $100, annual net sales....	$19.36
Profit per $100 sales above the breakeven point....	$22.65
Less: income tax at 50%........................	11.33
	$11.32
Less: dividend requirements at 50%.............	5.66
Retained earnings per $100 net sales..............	$ 5.66

$$\text{Annual growth factor } \frac{5.66}{19.36} = 29.3\%$$

The Wisconsin Manufacturing Corporation can finance 29.3 per cent more sales *above the breakeven point this year* than last year.

Earnings Are Cumulative and Compounding. How fast can the economy expand its volume out of retained earnings? How soon can a company double its business? The time required is determined on the basis of the rate of growth which the company could enjoy out of retained earnings. So long as the factors of the actual pattern remain the same, a uniform rate of growth is provided for. On the other hand, the amount of growth possible becomes larger each year because it is compounded.

On the basis of the assumptions in this problem the Wisconsin Manufacturing Corporation can finance out of retained earnings about 29 per cent more sales above the breakeven point, cumulative and compounded, each year.

Financing Sales from Retained Earnings: Formula. How long would it take to finance, out of retained earnings, a doubling of current sales volume? The answer to this question depends upon the growth factor above the breakeven point and the relationship of that point to current sales volume.

For example, the Wisconsin Manufacturing Corporation breaks even at $2 110 000 annual sales rate, or 52.7 per cent of the present $4 000 000 rate. The growth factor has been found to be 29.3 per cent above the breakeven point. Since only 47.3 per cent of their sales are above the breakeven point, the growth for the first year is 13.9 per cent (0.473 × 29.3 per cent). Sales would reach the $8 000 000 level in approximately 4½ years. With the method used above, any company can determine its profit pickup above the breakeven point and its operating capital requirements according to the capitalgraph. Attention is directed to the fact that this calculation is based on applying the additional profit of the business at the end of each year. Actually, the growth which accrues at the end of the year by the calculation can be applied as the profits are made during the year. To state this in formula form, however, would complicate the presentation materially. Judgment must be used whether to apply the formula on a quarterly, yearly, or even a weekly basis in each case.

Idle Capital when Sales Volume Is on the "Downside." When sales are declining and assets are under good managerial control, a fund of idle capital is created. Below the breakeven point, losses incurred will eat up the idle capital. If the losses persist, they will eventually bring insolvency. While carry-back and carry-forward refunds of Federal income taxes may give temporary relief, this windfall runs out with time and cannot be safely counted in capital coordination except as a stopgap.

The greatest danger, however, is *lag* in the control of the variable assets and costs which eat up these liquidation values as shown by the capitalgraph.

Investment in receivables and inventories does not respond to the tug of management at once. Time is required to accomplish these reductions. The more sharply sales decline, the more time is required. This condition presents a challenge even to the best managements and pushes many weak managements into bankruptcy. Lag is the result of a combination of indecision and procrastination "slippages" which accrue from lack of dynamic evaluation of the *time* segments.

The Laws of Capital Requirements. It is possible to state certain generalized laws for determining and appraising capital requirements.

1. The more current the asset or liability, the more sensitive the response to changes in volume of output. The measure of sensitivity is the relative proportion of float and variable requirements within the range of operating capacity.
2. Operating capital requirements are not limited to the accounting concept of working capital (current assets less current liabilities). Operating capital also includes deferred charges and fixed plant and equipment net of depreciation reserves.
3. A change in the efficiency of use of operating capital does not in itself create or destroy operating capital.
4. A change in the efficiency of use of operating capital changes the operating capital requirement for a given volume of output or the volume of output that can be supported by a given amount of operating capital.
5. Adequacy of operating capital is both quantitative and qualitative; the greater the relative liquidity, the greater the quality.
6. Changes in operating capital *amount* are derived from these sources:
    - *a.* Operating profits retained in the business.
    - *b.* Sales of fixed assets for cash.
    - *c.* Depreciation and leasehold amortization accrued in costs *less* actual cash outlays for fixed plant and equipment; the change can be either an increase or a decrease.
    - *d.* Income taxes accrued on current period operations less actual cash payments for tax accruals of prior periods; the change can be either an increase or a decrease.
    - *e.* Money borrowed, regardless of time for repayment, less actual cash outlays for repayment of debt; the change can be either an increase or a decrease.

f. Additional permanent investment evidenced by new issue of ownership certificates, regardless of class, or by perpetual debentures.

g. Capital dividends (paid in cash, not stock dividends or stock splits); previous tax payment rebates and other similar items of unusual nature.

7. The operating capital growth factor is the rate of retained earnings above the breakeven point, after taxes on income and dividends, divided by the variable rate of operating capital required.

8. The cost of fixed asset expenditures for the purpose of increasing capacity increases the capital float requirement in the same amount.

9. Output volume and potential profits as its corollary are limited by physical capacity and available operating capital. The measure of adequacy of operating capital is the capitalgraph applied to the projected volume.

Conclusion. Balancing capital required with available capital and the tie-in with profit potential are a major job of management. Too many companies get into hot water because they grow faster than their capital will allow, and because they have no plan to measure or provide for the resulting deficiencies. Company after company has built up management staff, productive facilities, and distribution facilities having capacity far in excess of the volume that could be financed. The resulting distortion creates high breakeven points when productive capacities outstrip the capital available to feed them.

The coordination of control which comes from use of the capital factors of float and variable and the breakeven factors of standby and variable is a prime requisite of the management of tomorrow. The best way to improve capital utilization is through control of what is now available and a clear knowledge of what is needed for growth. The capitalgraph and profitgraph coordination which is then available, simple, clear, concise, and expressed in dynamic terms, is the "slide rule" to good management relationships.

CHAPTER 11

BREAKEVEN AND CAPITAL CHARACTERISTICS BY INDUSTRIES[1]

Introduction. The continual growth of American industry since 1940 is bound to be reflected in the dollar values of breakeven points. The real measure of efficiency, however, is not found in the absolute breakeven dollars, but in the relative efficiency of the standby and variable factors which determine the breakeven point. In this chapter, an attempt is made not only to show the characteristics of breakeven points by major industry groups, but also to couple relative breakeven-point change in recent years with the working capital characteristics explained in Chapters 9 and 10.

The breakeven statistics which follow are the results of keeping scatter charts for 1 500 companies since 1937. This small number of corporations represents well over half of the manufacturing business in our economy. The striking fact of this analysis is that, after sustained growth to a level sometimes as much as four times that of the 1935 to 1939 period, companies can and often do maintain the cost trend line which establishes their breakeven point and their profit potentials. This belies the fact that so many people say breakeven points are continually changing. There is a change in absolute dollars as the value of the dollar increases and decreases, as sales prices change, and as capacity increases. Relative breakeven points in many companies, however, have held their basic relationship in terms of percentage of effective capacity and profit potential rate above the breakeven point.

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[1] This chapter is primarily intended to establish dynamic ratios by industries so that any company working with breakeven points or capitalgraphs can make rough comparisons with the historical standards for their type of business.

TABLE XIII. INDUSTRY FACTS, 1935 TO 1953 (ALL $ IN MILLIONS)

Facts, American manufacturing industries	1935–1939	1947–1950	1951–1953
Manufacturing sales	$64 700	$168 100	$246 100
Number of corporations	90 000	125 000	135 000
Capital invested	$45 000	$100 000	$110 000
Net earnings, capital invested	5.0%	4.9%	4.6%
Debt	$ 4 000	$ 17 000	$ 20 000
Number of people employed	28 000 000	33 000 000	35 000 000

The breakeven characteristics and pertinent facts concerning profit possibilities for all industry during these three periods follow:

	1935–1939	1947–1950	1951–1953
Breakeven point in % of sales	53.4%	48.7%	51.9%
Variable cost per $100 net sales	$77.40	$78.50	$81.20
Variable pickup per $100 above breakeven point	$22.60	$21.50	$18.80
% standby (or inflexible costs) to sales	12.1%	10.5%	10.0%

Over a 15-year interval, the breakeven point in relationship to sales shows no material difference: (53.4 vs. 51.9 per cent). This is somewhat misleading, because the variable pickup above the breakeven point per $100 sales has fallen from $22.60 to $18.80, or 17 per cent. The potential profit is less because variable costs have risen faster, especially since 1947, than selling prices. Breakeven points remain at the same percentage of sales simply because standby costs previously 12.1 per cent of output are now only 10 per cent. As volume rises, inflexible (standby or fixed) costs become a lesser percentage of the total cost values. See the laws of profits (page 46).

An analysis by assets classifications indicates that the 1952–1953 average variable cost per $100 of net sales varies greatly with company asset size. In corporations having less than 1 million dollars of assets, the variable was $87.20. From 1 million to 5 million dollars it had risen to $88.50; for corporations with assets of 5 to 10 million dollars, the variable was $76 per $100 of net sales; and corporations with over 10 million dollars in assets averaged $78.50. The difference in profit potential between the smallest asset-size corporation and the largest was therefore 9 cents per dollar of sales and indicates that operating efficiency is markedly better in companies with above 10 million dollars of annual sales.

Today's Breakeven Characteristics by Industry. Using Securities and Exchange Commission and Federal Trade Commission figures as recorded in their quarterly financial reports and the scatter-chart method of plotting, breakeven points by industries can be obtained. The results of this charting provide the industry breakeven points shown in Table XIV.

TABLE XIV. 1951–1953 BREAKEVEN POINTS BY INDUSTRIES

Industry	Net sales volume per year in million $	Standby per year in million $	% standby to annual sales	Variable rate per $100 net sales	Break-even point in net sales, $	% break-even point to net sales
Food	$ 43 000	$ 1 080	2.5	$93.80	$ 17 400	40
Tobacco	3 500	120	3.4	89.00	1 090	31
Textile	14 300	1 200	8.4	86.20	8 700	61
Apparel	8 500	748	8.8	88.90	6 740	79
Lumber and wood	5 400	720	13.3	79.00	3 420	63
Furniture and fixtures	3 600	284	7.9	84.90	1 880	52
Paper and allied products	7 900	1 280	16.2	75.75	5 300	67
Printing and publishing	5 000	360	7.2	85.60	2 500	50
Chemical	16 600	3 720	22.4	64.25	10 410	63
Petroleum and coal	20 000	2 040	10.2	78.13	9 300	47
Rubber	5 200	640	12.2	77.40	2 830	54
Leather	3 000	320	10.6	86.25	2 330	78
Stone	5 900	640	10.8	72.00	2 280	39
Nonferrous metal	6 800	628	9.2	75.60	2 575	38
Iron and steel	16 000	2 000	12.4	72.25	7 230	45
Fabricated metal	12 200	2 200	18.1	73.00	8 150	67
Machinery, except electrical	21 000	2 200	10.4	77.75	9 800	47
Electrical machinery	13 000	2 000	15.4	74.90	7 960	61
Transportation equipment	7 500	520	6.9	88.33	4 555	61
Motor vehicle	20 000	1 240	6.2	82.30	7 020	35
Instruments: photo, etc.	3 200	320	10.0	78.00	1 450	45
Miscellaneous	4 500	480	10.6	82.00	2 660	59
Total:						
1951–1953	$246 100	$24 740	10.0	$81.20	$125 580	52
1947–1950	168 100	17 630	10.5	78.50	82 100	49
1936–1939	64 700	7 818	12.1	77.40	34 600	53

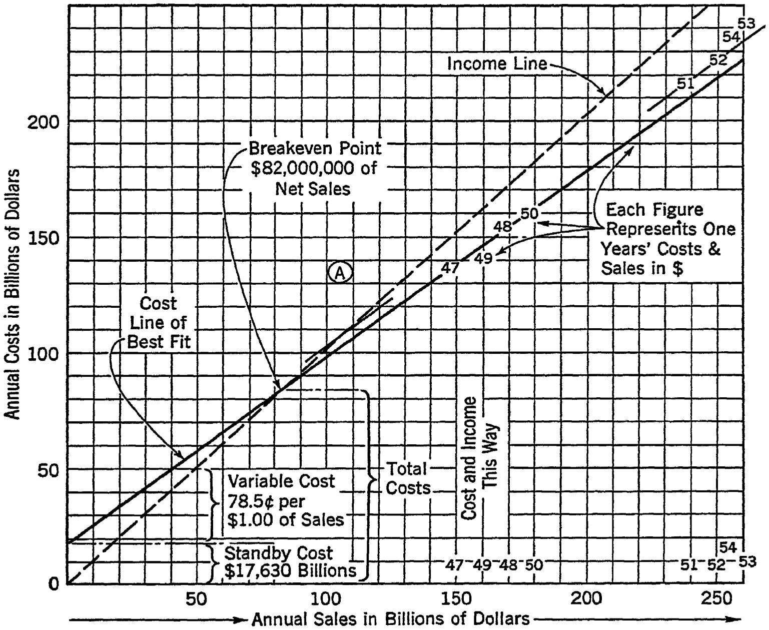

Chart 26. All U.S. manufacturing companies breakeven graph and cost determination based on 1947–1950 results.

Notice the wide variation of industry breakeven points and variable costs as a percentage of net sales among the 22 industries. For example, the chemical industry (a young high-growth industry) had a variable cost of $64.25 per $100 of sales. The electrical-machinery industry, an industry which has "settled down," showed a median variable cost rate of $75 per $100 of sales. At the other extreme, the food industry, with its close margin, high turnover, and highly competitive stable products, showed a variable cost of $93.80. Offsetting this high variable rate, however, the food industry had a standby cost of only 2.5 per cent of sales in contrast with the chemical industry's standby costs of 22.4 per cent of sales.

The significant fact is the resultant variable and standby relationship measured in the breakeven point. With 1951–1953 proportions of costs, volume, and selling prices, the average breakeven was 51.9 per cent of sales volume. By industries, however, this ratio varied from a low of 31.2 per cent to a high of 79.1 per cent.

Comparison of 1936–1939 Breakevens and 1952–1953 Breakevens. A comparison of the salient factors of breakeven points, variable costs, and standby costs between 1952–1953 and 15 years earlier indicates the changes in the components which determine the breakeven point and the breakeven relationship to sales (see Table XV).

While the breakeven points did not materially change in relationship to sales or capacity during this 15-year span, the variable pickup diminished. Most of this softening occurred after 1947, when the battle for rising selling prices to meet increased costs was lost in some industries. Costs continued to increase while dampers on corresponding selling-price increases appeared as competition to use the enlarged facilities became more severe.

A scatter chart of all industries, using the data reflected in Table XV, is shown in Chart 26. Notice the close fit of the years 1947 through 1950 and how 1951 and 1954 began to usurp the profit path. If this trend continues, the breakeven point will be in the neighborhood of 120 billion dollars (see *A* in Chart 26).

Profit Paths Have Diminished at an Increasing Rate in Recent Years. Applying 1947 to 1950 standby and variable factors to 1952 sales measures the softening of the profit zone. This softening would not be apparent in a consecutive listing of static profit

TABLE XV. BREAKEVEN POINT COMPARISON, 1936–1939 WITH 1952–1953, BY INDUSTRIES

Industry	Breakeven point % of net sales		Variable costs		Standby costs % of net sales	
	1936–1939	1952–1953	1936–1939	1952–1953	1936–1939	1952–1953
Food	37.6	40	$93.60	$93.80	2.4	2.5
Tobacco	37.6	31	93.60	89.00	2.4	3.4
Textile	69.7	61	79.00	86 20	14.6	8.4
Apparel	69.7	79	79.00	88.90	14.6	8.8
Lumber and wood	73.0	63	85.00	79.00	9.0	13 3
Furniture and fixtures	73.0	52	85.00	84.90	8.2	7.9
Paper and allied products	72.1	67	69.26	75.75	22.0	16.2
Printing and publishing	46.0	50	86.00	85.60	6.5	7.2
Chemical	48.0	63	74.75	64.25	12.1	22.4
Petroleum and coal	65.3	47	69.00	78.13	20.1	10.2
Rubber	68.6	54	78.75	77.40	14.2	12.2
Leather	70.8	78	85.00	86.25	10.6	10.6
Stone	39.4	39	79.40	72.00	8.2	10.8
Nonferrous metal	35.4	38	72.20	75.60	9.7	9.2
Iron and steel	68.0	45	76.33	72.25	16.1	12.4
Fabricated metal	60.0	67	78.50	73.00	28.0	18.1
Machinery, except electrical	55.2	47	72.75	77.75	15.0	10.4
Electrical machinery	55.2	61	72.25	74.90	15.0	15.4
Transportation equipment	64.5	61	78.20	88.33	14.1	6.9
Motor vehicle	45.5	35	78.20	82.30	9.9	6.2
Instruments: photo, etc.	45.5	45	78.50	78.00	9.8	10.0
Miscellaneous	45.5	59	78.50	82.00	9.8	10.6
Total	53.4	53	$77.40	$81.20	12.1	10.0

ratios because higher and higher dollar volumes allowed still higher profit ratios. The undertow effect of variable costs usurping the profit zone, however, will expose itself in the first year of declining sales. The comparative analysis of 1952 operations would be as follows:

	Billions of $
Volume of sales, 1952	$246.1
Costs at 1947–1950 efficiency:	
Variable costs ($246.1 billion × $78.5)	$193.2
Standby (see Table XIV)	17.6
Total projected costs, 1947–1950 pattern	$210.8
Expected profit to maintain old breakeven relationship	$ 35.3
Actual average 1952–1953 profit	22.5
Loss in profits before taxes due to breakeven increase and profit-pickup reduction	$ 12.8
Effects of change in breakeven point:	
1947–1950 breakeven in sales	$ 82.1
1952–1953 breakeven in sales	131.2
1947–1950 variable pickup	$21.50 per $100 net sales
1952–1953 variable pickup	18.80 per $100 net sales

Working Capital Characteristics by Industries. Application of scatter-chart analysis to balance-sheet elements will develop working capital requirements as readily as cost factors. This was discussed in Chapters 9 and 10. The characteristics of the 22 industries with respect to profit potential, dividend disbursement, and working capital requirements are summarized and compared in Table XVI.

Where the potential profit-pickup rate exceeds the variable capital requirement rate, there is a strong internal growth factor. This fortunate condition obtains for but half of the industries on a pretax basis, and for none of them after taxes and dividends. The half that are relatively fortunately situated also account for two-thirds of the "float" requirements.

From this table we can draw several conclusions provided it is recognized that we are dealing with industry composites. Individual companies can and do differ; the composites are indicative only of general probabilities.

It is evident that high profit potential tends to accompany relatively lower variable capital requirements. But high profit po-

TABLE XVI. PROFIT POTENTIAL COMPARED WITH WORKING CAPITAL REQUIREMENTS BY INDUSTRIES

Industry	1952–1953 profit potential		Working capital required ‡	
	Rates per $100 sales above breakeven		Variable rate per $100 net sales	Float in million $
	Before tax *	After 50% tax †		
Food	$ 6.20	$ 3.10	$13.80	$ 500
Tobacco	11.00	5.50	33.00	80
Textile	13.80	6.90	18.00	1 000
Apparel	11.10	5.55	20.50	500
Lumber and wood	21.00	10.50	21.00	100
Furniture and fixtures	15.10	7.60	21.75	50
Paper and allied products	24.25	12.12	16.90	300
Printing and publishing	14.40	7.20	18.20	80
Chemical	35.75	17.87	20.70	1 000
Petroleum and coal	21.87	10.93	22.25	250
Rubber	22.60	11.30	18.00	400
Leather	13.75	6.88	23.75	50
Stone	28.00	14.00	18.60	300
Nonferrous metal	24.40	12.20	15.40	800
Iron and steel	27.75	13.87	14.40	1 200
Fabricated metal	27.00	13.50	25.00	400
Machinery, except electrical	22.25	11.12	18.25	2 000
Electrical machinery	25.10	12.55	14.00	900
Transportation equipment	11.67	5.83	12.00	1 000
Motor vehicle	17.70	8.85	17.00	500
Instruments: photo, etc.	22.00	11.00	24.50	200
Miscellaneous	18.00	9.00 §	30.40	50

* 1952–1953 variable cost rates from Tables XIV and XV subtracted from $100 of net sales gives these rates of profit potential or "profit pickup" above the breakeven point.

† A 50% effective tax rate is assumed as being typical, and for easy figuring.

‡ Working capital requirements based upon scatter charting of past requirements. Capital expenditures in excess of depreciation accruals are not covered by these allowance factors.

§ Before dividends, interest, and other nonoperating expenditures.

tential, or its complementary low variable cost rate, also tends to require heavy basic capital investment. In fact, the high capital investment may actually mean wasteful use of working capital in individual companies. On the other hand, in this area are the "growth" industries, at least those most likely to be able to finance their growth out of earnings retained and by trading upon their tax accruals.

The tabulated relationships also throw light upon the kinds of industries most likely to have difficulty in the capital markets in a period of growth or in a period of falling prices. The important relationship to bear in mind is not whether the capital requirement is high or low, but rather how it compares with the profit-potential rate. This kind of analysis gives a new and sounder basis for decisions concerning dividend and financing policies.

Determining the United States Steel Breakeven Point. The United States Steel Corporation (included in the iron and steel industry classification, Table XVI) can be used as a specific illustration of the workings of the factors which control breakeven points based on the company's own analysis. The illustration also demonstrates how breakeven characteristics can be used to explain profit and selling-price problems to a governmental body.

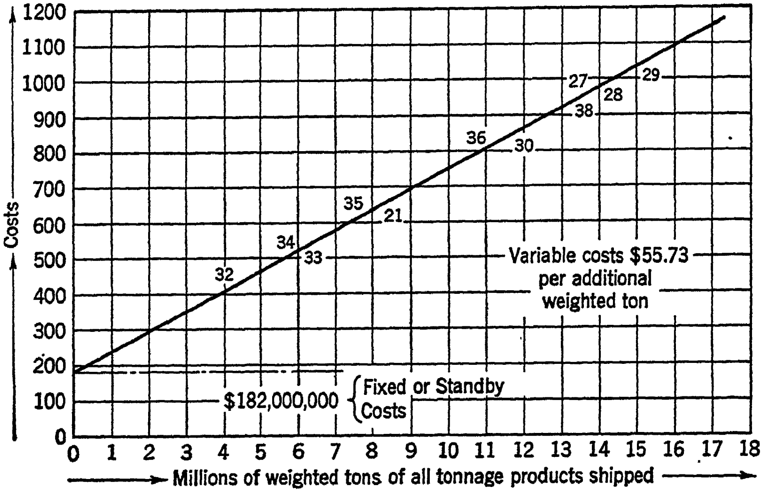

Chart 27. U.S. Steel Corporation relationship between total costs of operation and volume of business, 1938 conditions.

In 1938 the United States Steel Corporation prepared a series of breakeven analyses to establish the magnitude of inflexible costs and the effects these costs had on profits with changing price, volume, and costs. In this presentation, Big Steel determined from scatter charts of their historical operations that their costs consisted of two factors:

1. Fixed costs (standby costs) which must be met regardless of operating volume. These costs were then $182 100 000 a year.
2. Added variable costs of $55.73 for each weighted ton of product shipped.

The over-all scatter chart prepared by the United States Steel Corporation is shown in Chart 27. A detail of these costs by the several elements is shown in the accompanying table.[1]

Item	Costs that must be met regardless of operating rate *	Additional costs for each weighted ton of product shipped *
Interest	$ 8 300 000	$ 0.00
Pensions	7 700 000	0.00
Depreciation and depletion	29 500 000	2.37
Taxes other than social security and federal income	24 200 000	1.43
Payrolls	62 100 000	29.10
Social-security taxes	2 500 000	1.16
Goods and services purchased, etc.	47 800 000	21.67
Total costs	$182 100 000	$55.73

* As presented to the 77th Congress, Temporary National Economic Committee.

In its presentation to the Temporary National Economic Committee, Big Steel had the following to say: "The costs embraced in the $182 100 000 are those which are incurred regardless of differences in volume ranging from 17.7% to 90.4% of annual ingot capacity and, hence, may be termed 'fixed costs.' "

[1] Source: United States Steel Corporation, *Chart Studies,* Vol. II, p. 54.

United States Steel and Reduced Selling Prices. What happens when volume falls off and prices soften? If selling prices should soften 10 per cent or more, what would happen to today's breakeven points tomorrow? Look at United States Steel again.

United States Steel summarized its cost structure as being $182 100 000 per year regardless of volume, plus $55.73 per weighted ton of product. Since that tonnage sold for an average of $77.66, United States Steel enjoyed a gain per ton above the breakeven point of $21.93 per ton ($77.66 – $55.73 = $21.93). This produced a breakeven point at 8 300 000 tons per year. Note what United States Steel said in its report concerning this matter.

"While an increase in the volume of steel sold results in a considerable reduction in costs per ton,[2] the reduction is not so great as to permit of any sizable reduction in price without a much greater relative increase in volume. At the average amount of sales and revenues per weighted ton prevailing in 1938, total sales and revenues would be sufficient to cover total costs if shipments amounted to about 8 300 000 weighted tons or more, which is equivalent to an operating rate of 40% to 45% of capacity, depending upon the type of products shipped. A reduction of 10% from the average 1938 prices would so reduce the total sales and revenues that the breakeven point would not be reached until shipments had reached about 12 400 000 weighted tons [instead of 8 300 000 tons as shown in their 1938 scatter chart]. Hence a 10% reduction in price could be offset only by a 48.8% increase in volume. This relationship is not confined to the breakeven point, for to net any particular amount of profit or loss at prices 10% below the average 1938 level would require a volume of 48.8% above that required at average 1938 prices."

The corporation demonstrated further to the Committee, by bar charts, "that a 20% reduction in price would require a 220.8% increase in volume in order to produce the same dollar results after the decrease as before."

The United States Steel Breakeven Point after 15 Years. Moving forward 15 years from this original presentation, the United

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[2] This reduction is due to the fact that the variable costs are supposed to increase or decrease with volume at the rate of $55.73 per ton while the standby or fixed costs remain at $182 100 000 per year regardless of volume.

States Steel Corporation breakeven point changed markedly in terms of tonnage sales (see Table XVII).

TABLE XVII. UNITED STATES STEEL BREAKEVEN POINT: COMPARISON—SELECTED PERIODS

	1937	1947–1950	1952
Tons shipped (million tons)	12.2	20.0	21.10
Selling price per ton	\$77.66	\$130.00	\$148.50
Variable cost per ton	\$55.73	\$ 92.40 *	\$112.50 *
Variable pickup per ton	\$21.93	\$ 37.60	\$ 36.00
Breakeven tons (million tons)	8.39	10.00	11.70
% breakeven to tons shipped	68.8%	50.0%	55.5%

* Based on up-to-date scatter charts.

In conjunction with the analysis in Table XVII, what would happen to Big Steel today if prices were reduced? Note the effects of 10 per cent reduction in selling price on Big Steel's latter-day breakeven point (see Table XVIII). Notice that the profit potential per ton after a 10 per cent price reduction would be less than in 1938 even though standby costs had risen to 2.3 times the 1938 costs in dollars.

TABLE XVIII. UNITED STATES STEEL BREAKEVEN POINT: 1952 COMPARISON WITH 10% REDUCTION IN SELLING PRICE

1952 selling price per weighted ton	\$148.50
Less 10% reduction	14.85
New selling price (after 10% reduction)	\$133.65
Less variable cost per ton	\$112.50
Variable pickup per ton	21.15
Present standby cost \$422 000 000 = revised B/E point = 19.94 million tons	
% breakeven to tonnage sales (after 10% reduction)	94.5%

Effect of Selling-price Reduction and Lags on Industry Breakeven Points. Applying the logic used by the United States Steel Corporation in line with the general principles of breakeven points, Table XIX shows what would happen to American industry if selling prices weakened generally. The number of industries which would need their going rate or even a higher rate of output merely to break even is quite disturbing.

The reader is cautioned, however, not to let his imagination run away with him. Nothing is said to indicate that costs cannot be reduced when selling prices are reduced; in fact, it is only logical that if the price structure weakens, eventually the materials produced by other industries can be purchased for less. Past history has shown, however, that selling prices often weaken without immediate corresponding reduction in cost of materials.

This table emphasizes the impact of selling price and cost reduction lag on the breakeven point.

Effects of Price Reduction and Cost Lag on Industry Breakeven Points. The logic used in the United States Steel Corporation presentation, in line with the general principles of breakeven-point analysis, can be applied more generally. Falling physical volume of itself does not change the breakeven point. If there is a lag in removing costs as volume falls, and at the same time there is a softening of selling prices, breakeven points can rush upward at an alarming rate. When a drop in sales volume appears, what happens?

To illustrate, the net billings of American industry for the third quarter of 1949 were materially less than those of the third quarter of 1948. The reductions in percentages are given in Table XX for the major industry classifications.

Some of these reductions were reductions in physical volume and some were due to a softening of prices. It is not necessarily true that costs cannot be reduced when selling prices are reduced; in fact, it is but logical that when there is a general weakening of price structures, industries at the end of the chain will purchase their materials for less. Past history has shown, however, that selling prices often fall before there is any relief in the cost of materials used in the product.

For illustrative purposes, we have assumed a rate of price reduction for these industries and show the breakeven-point effect in Table XIX. In about half the cases there would be serious trouble as the breakeven point outstripped resultant income. In but a few would there be any semblance of a healthy breakeven-point relationship. In between are those which would need all of the then current volume to break even.

TABLE XIX. SALES REDUCTION AND EFFECT ON BREAKEVEN POINTS BY INDUSTRIES

Industry	B/E point % to net sales	Illustrative price reduction, % *	Results after indicated price reduction			
			Variable pickup	B/E point in million $	Revised sales	B/E point % of revised sales values
Food	40.6	3	$0.033	$32 730	$41 710	78.6
Tobacco	31 2	3	0.082	1 470	3 390	43.4
Textile	60.7	5	0.092	13 050	13 580	96.2
Apparel	79.1	5	0.065	11 500	8 070	145.0
Lumber and wood	63.5	10	0.132	5 440	4 860	111.8
Furniture and fixtures	52.3	10	0.157	1 810	3 240	55.9
Paper and allied products	67.0	10	0.158	8 100	7 110	113.8
Printing and publishing	50.0	10	0.049	7 340	4 500	163.0
Chemical	63.0	10	0.286	13 040	14 940	87.2
Petroleum and coal	46.5	10	0.132	15 440	18 000	85.8
Rubber	54 4	10	0.140	4 580	4 680	97.9
Leather	77.7	10	0.045	7 100	2 700	263.0
Stone	38.8	10	0.200	3 200	5 310	60.4
Nonferrous metal	37.8	10	0.160	3 920	6 120	64.1
Iron and steel	45.2	10	0.197	10 150	14 400	70.5
Fabricated metal	66.8	10	0.189	11 640	10 980	106.0
Machinery, except electrical	46.6	10	0.136	16 180	18 980	85.2
Electrical machinery	61.0	10	0.168	11 880	11 700	101.4
Transportation equipment	59.4	10	0.019	27 400	6 750	406.0
Motor vehicle	35.1	10	0.086	14 440	18 000	80.3
Instruments: photo, etc.	45.5	10	0.133	2 410	2 880	75.4
Miscellaneous	59.2	10	0.088	5 450	4 050	134.4

* Price reductions are calculated from average 1952 prices.

TABLE XX. SALES COMPARISON, 1948, 3D QUARTER, TO 1949, 3D QUARTER, BY INDUSTRIES

Industry	*% sales reduction, 1949, 3d quarter, vs. 1948, 3d quarter*
Food	− 3.2
Tobacco	− 4.7
Textile	−13.1
Apparel	−11.1
Lumber and wood	−12.4
Furniture and fixtures	−12.6
Paper and allied products	−11.8
Printing and publishing	− 4.8
Chemical	−11.1
Petroleum and coal	−11.0
Rubber	− 9.1
Leather	−11.8
Stone	−11.8
Nonferrous metal	−15.0
Iron and steel	−12.0
Fabricated metal	−11.1
Machinery, except electrical	−11.9
Electrical machinery	− 7.0
Transportation equipment	−10.8
Motor vehicle	+12.3 *
Instruments: photo, etc.	−11.0
Miscellaneous	−10.9
Total average all industries	− 9.33

* Sales increase instead of reduction.

The Effect of Lag. Lag in cost control usually appears at the first hesitation in orders received. Wishful thinking dilutes the conclusions of the analyst, and troubles are compounded. When either selling prices or volumes deteriorate, beating out any lag in cost control becomes a first order of business.

Where there has been a previous expansion and attendant building of organization capacity in anticipation of still greater volumes, the effect of lag appears suddenly and with great impact at the first leveling off. Comparison of the third quarters of 1947, 1948, and 1949 brings out the extent of lag. Table XXI measures that lag by industry classifications.

The variable rate of costs per $100 for the third quarter of 1948, assuming the continuity of 1947 standby costs, averaged $93.90.

TABLE XXI. FALLING VOLUME AND LAG, 1948, 3D QUARTER, TO 1949, 3D QUARTER, BY INDUSTRIES

Industry	Variable increase in costs per $100 sales, 1948, 3d quarter, over 1947, 3d quarter	Variable decrease in costs per $100 sales, 1949, 3d quarter, vs. 1948, 3d quarter	Residue lag between 3d quarter, 1948, and 3d quarter, 1949
Food	$ 46.10	$108.00	$ 61.90 *
Tobacco	75.80	62.60	13.30
Textile	80.70	35.90	44.80
Apparel	120.00	78.60	41.40
Lumber and wood	96.80	57.40	39.40
Furniture and fixtures	102.80	82.20	20.60
Paper and allied products	103.40	68.80	34.60
Printing and publishing	121.20	72.50	48.70
Chemical	78.90	86.30	7.40 *
Petroleum and coal	75.20	38.40	36.80
Rubber	62.80	52.80	10.00
Leather	96.80	82.10	14.70
Stone	51.70	94.10	42.40 *
Nonferrous metal	68.40	80.20	6.20
Iron and steel	72.30	73.20	0.90 *
Fabricated metal	89.90	72.10	17.80
Machinery, except electrical	90.20	81.70	8.50
Electrical machinery	121.30	79.00	42.30
Transportation equipment	84.50	100.00	15.50 *
Motor vehicle	77.60	83.90	6.30 *
Instruments: photo, etc	89 60	66.70	22.90
Miscellaneous	240.00	46.50	193.50
Average all	$ 93.90	$ 73.00	$ 20.96

* Industries which reduced costs in excess of previous increase.

That is, management added $93.90 of variable cost for each $100 of sales volume realized.

As volume fell off from 1948 to 1949 (third quarters) management reduced its costs, not at $93.90 per $100 of sales, but only at a $73 rate. For each $100 of reduced or lost sales volume, $20.96 of cost remained with the average company. Failure to reduce costs downward at the rate of previous rise is *cost lag.* Duration and severity vary with the unpredictable aspect of speed of the volume reduction. Table XXI indicates the wide variation of the net residue of lag in this two-year period.

The magnitude of the *lag* varies naturally by industries. In the food and tobacco industries, for example, lags are minor because industries with high raw-material content, high turnover, are more sensitive to reduced selling prices of suppliers than are most metalworking enterprises in which the product passes through mining, processing, and fabrication in longer cycles.

"It can't happen today" may be the password while business is good. It has been the password before, i.e., from 1929 to 1932, in 1937–1938, from 1945 to 1948, and in 1952. In these periods lag was allowed to start and gathered such weight that cost reduction at first failed to hold the old breakeven points. Many industries never caught up as the volume reduction accelerated. When the downthrust was over, the cost lag was translated into new standby as the costs not removed on the down cycle took on a fixed nature. As volume recovered, breakeven points were established at permanently higher relative levels because costs added as variables were now standby. These synthetic standbys do not look bad after the upswing has gained some momentum, but nevertheless produce a permanent weakening of the profit potentials of the businesses so affected.

In the minds of most management men there is an honest feeling that when selling prices soften and volume drops, their fire-alarm system will ring and everyone will proceed to put the fire out by reducing costs. Just to maintain the existing breakeven point as sales fall, and making no effort whatever to reduce the breakeven point commensurate with falling sales, is a major management task. Referring again to Table XIII, each industry *must* reduce costs at the rate of its variable cost factor just to hold the same dollar breakeven point. To maintain the same breakeven relationship to sales the reduction must exceed the former variable rate or include standby costs.

To summarize the workings of *lag* in each element of the breakeven point:

Standby Costs. No reduction is necessary in standby costs to maintain an existing breakeven point. An increase in the standby costs because of additional future commitments, however, can adversely affect the breakeven point. It is important to remember that though standby holds level on falling sales the breakeven-point percentage to sales increases even though the breakeven point in dollars does not change.

Variable Costs. Variable costs, largely payroll, productive material, and some overhead material, will not disappear automatically just because sales have fallen off. Table XIV indicated that the variable increment cost of sales was $81.20, varying by industry from a low of $64.25 to $93.80. If volume falls off, those amounts must be removed from costs for each $100 of reduced sales or the breakeven point will rise to meet falling volume. Meeting this requirement alone is a major task of management. It has not been too well accomplished in the past; cost control has lagged behind, and breakeven points have risen.

It should not be construed that it is impossible to reduce expenses or costs at the same rate they were added. History indicates that *lag* occurs and varies tremendously by industry, managements, severity of decline, and external forces. It also indicates that sooner or later manufacturing companies have been driven, through necessity, to make up the deficiencies of lag which accumulated in some past period. The major point from a breakeven-analysis point of view is that if the variable cost on which the breakeven is set shows that costs went up at the rate of 80 cents, they must come down at the rate of 80 cents or *lag* accrues.

Conclusion. An analysis by industries and comparison of industrial periods establish two important guides for improving management performance. The characteristics of an individual company can be compared with the bench marks of its industry. The tendency of lag patterns to repeat can be recognized and forestalled more effectively if their dangers can be related to the experience of the individual company. While "my company is different" may be the password in many enterprises, there is one inescapable fact. Variable rates by industries *are* directly comparable. If the variable cost rate for any company is higher than the average for its industry, that company is at a competitive price disadvantage.

Section Two

USE OF BREAKEVEN POINTS IN MANAGEMENT DECISIONS

A number of sailboats start in a race. Each crew has high hopes that several hours later their boat will be declared the winner. Theoretically all should cross the finish line together since each boat is of the same class, has the same size crew, carries the same sail spread, and sails the same course. When the finish comes, the difference in time between the first and the last boat will be many minutes. This spread in time is caused in the main by the resourcefulness and "knack" of the skipper during the race.

So with the breakeven point. It is a guide chart for management to use in maneuvering toward an ultimate goal. Like the sailboat skipper who used his resources correctly, a manager who can integrate breakeven philosophy as he sails his course will outdistance his less apt competitors. A breakeven point never runs a business. In helping to discern a little more closely the variations and their cure lies its usefulness. This section describes applications of breakeven-point analysis to types of cases in which decision is difficult.

CHAPTER 12

USE OF BREAKEVEN POINTS TO PLAN AND FORECAST COSTS

Introduction. Forecasting and budgeting are often a haphazard undertaking in many organizations. Much so-called intimate and detailed forward planning of objectives often fails to reap a full harvest because the follow-through from plans to actual accomplishments is neither positive nor clearly compared and reconciled with actual results.

The breakeven concept expressed in time costs provides the basis for reconciling the variations between an actuality and a forecast as they unfold. A breakeven concept is concise and fair to the people who are held accountable for forecast results. It is a common denominator from which the conflicts between plans made in good faith and performances made by men who make mistakes can be compared so that alibis are segregated from the unpredictable. As such, it is a means of educating management in better forecasting techniques as time passes.

The Simple Arithmetic of Forecasting. An illustration of the simplicity of a forecast can be found in the affairs of a company which plans $1 200 000 of sales in the next year, an average of $100 000 per month. It is hoped that cost will be $1 000 000, leaving a profit before taxes of $200 000. These hopes are wonderful but unrealistic until they can be followed, watched, and controlled as the year passes. The following types of questions must not only be answered in the forecast, but they must be certified as accomplishments become realities:

1. Are the sales $100 000 a month or are some months higher or lower? If this produces major variations between months, the sales forecast should be built by months.

2. Does the product mix vary from month to month? If so, the sales forecast should be broken down by months by products.
3. How much of the cost is material? labor? burden? selling and administrative costs? other costs?
4. What is the breakeven point that this forecast provides?
5. How does the forecast breakeven compare with the last actual breakeven?
6. Are the unseen costs (overhead items) broken down by accounting periods by months?

Until these questions are answered, and detailed objectives recorded, a forecast is something that is too often thrown together under high pressure just before the start of a new year and then relegated to the desk drawers of the chief executive officers because the forecast loses its "touch" in comparison with actual conditions. The forecast then fails to serve its real purpose: a basis on which to control costs and meet the profit objectives.

Use of Breakeven Points in Looking Ahead. Many companies purport to know their breakeven points but use breakeven concepts in a superficial, haphazard way. Too often this leads to confusion in management because breakeven philosophy is expressed in vague generalities rather than with the supporting facts of *time* sequences, the basis of good decisions.

The important usefulness of breakeven points lies in the process of budgeting, forecasting, and controlling costs. In itself, a breakeven point moves only with changing conditions and, in moving, flashes a warning. To ensure follow-through from this warning requires a detailed control employing the *time* concepts supporting the breakeven goal, cleanly expressed as goals at all management levels of decision in the business.

Forecasting vs. Budgeting. The words "budget" and "forecast" are often used interchangeably to represent the act of estimating future sales and costs and to plan operations involved in profit making or net worth protection during some future period of time. "Forecast" and "forecasting" should be limited, however, to this process of looking ahead. The term "budget" should be restricted to the orderly plan for controlling sales costs, research, engineering, balance-sheet items, etc., as the forecast periods become reality.

What Is Forecasting? Forecasting is, then, by definition, *looking ahead,* planning conditions in futures. The budget is the base line from which to measure forecast realization, whether in sales, operating costs, or expenses, as the period forecasted passes into a period of performance, then into retrospect. The term "variable budget" is the instrument for measuring as futures become reality. A variable budget provides for checking performance against actual volume realized in detail regardless of whether actual volume coincides with the forecast volume.

Most anything that can be evaluated in a business can be forecast or planned ahead. Capital expenditures, cash, inventory, and other components of working capital are also common subjects for forecasting with a degree of precision depending upon their urgency. For example, a company well supplied with cash is not too much interested in a cash forecast. On the other hand, a company which has a seasonal production or sales problem may need an accurate and detailed inventory forecast.

The most frequent subject for forecast, often referred to as the "annual budget," is the volume of sales or units of production for the coming year. Some companies also prepare a three- or five-year forecast of this item. This type of prognostication has many pitfalls, since it is often completely at the mercy of an external economy predictable only in the broadest generalities for short future periods and subject to hardly more than fondest hope for longer periods of time. Because of this inability to sense with any degree of *confidence, assurance,* or *accuracy* the external conditions which affect sales, many forecasts break down as they become epilogue. This is especially true in years when the economic changes from the past are great. Unfortunately, these are the years for which a forecast is most needed to project the changing conditions into the costs of doing business.

Under static budgeting there is no way to cope with external force except continually to change the forecast as conditions change. All the details of the forecast must then be reworked. If this is done several times, the original objectives are distorted or lost and confidence is destroyed. No wonder many executives say, "Budgets, I don't want them; they just confuse me." With coordinated standby and variable factors, it is comparatively easy to establish a performance goal by departments suitable for application to changing volume as the year unfolds. Original objectives are not destroyed because performance and volume variations can be isolated continuously.

How Good Is a Forecast? Since forecasting is planning more than recording dollar values, management should question any specific forecast in detail and carefully record the basis on which it proposes to operate:

1. What is the basic managerial policy for the forecast period in terms of plant additions, shift policies, working capital, borrowing of money, new products, advertising, and such other matters as may have an important influence on future costs?
2. What is the basic sales policy for the forecast period?
3. Will changes in the organization be necessary to carry out the forecasts?
4. Have managerial controls been adequate to give satisfactory information for comparison of projected (forecast) and planned (budget) results with actual (realization)?
5. Is the forecast arranged to coincide with the manner of reporting actual results so that the forecast can be used in analytical comparison?
6. Are major efficiency improvements predicted during the forecast period? Are they defined so their progress can be charted and checked? What do these changes do to the existing breakeven point?
7. Does the forecast plan coordinate sales, manufacturing, engineering, research, and finances? As parts of a whole? As a basis for actual control?
8. Is there adequate working capital to meet the forecasted volume? Does the plan for volume tie in with capital availability or are "heads buried in the sand" on that point?

Importance of Trend. What is the trend of the business or where is it going? In forecasting or predicting future expectancies, the determination of probable trend is management's job. If management is innocent of the influences that affect the business course, forecasting procedure and its results are of little value as a control. The degree to which trends must be studied depends upon the length of period for which the forecast is being made. In a long-term forecast changing economic influences may be of prime importance, whereas in a series of short-term forecasts, the rate of change may be of little influence. Regardless of the period to be studied, it is important that the influences which may *distort* or *destroy* the prognostication be analyzed.

Some managements avoid all this by alibiing, "How can anyone predict the future today?" Perhaps this is more difficult than ever before, but if variable and standby factors are used, the sting of poor forecasting is overcome and the process leads to better results as it "rings out" each time a major variation arises.

Under variable budgeting the period of looking ahead is not of primary importance, inasmuch as variable rates can be applied to meet changing conditions and yet be reunited to any given or static relationship for comparative purposes. Under variable budget control, a forecast can be adjusted to revised sales without losing basic relationships. This is impossible under static thinking unless a complete new forecast is prepared and involved reconciliations made to adjust specifically for each and every change from plan.

Forecasting the Breakeven Point. Since management's composite ability to control jagged segments of *time* is mirrored in the breakeven point realized, any forecast should also be summarized in breakeven terms. A comparison of profit and loss statements obtained by projection from an existing breakeven-point pattern with a summation of proposals of department heads who plan variations from their own standby and variable factors can be assumed for purposes of illustration. Table XXII presents an assumed forecast for the Wisconsin Manufacturing Corporation. (See page 128.)

Using the Forecast to Get Action. How simple it is for an alert management to select and carry out corrective action when comparisons are free of the distortion of volumes! *Relatively,* the greatest potential increases in cost lie in factory burden and in administrative expense. Behind them in *relative* importance rank selling and prime material costs. The big money is in factory overhead and in prime material.

Purchasing and engineering can join hands in the attack on material costs. Reviewing overhead practices and overhead organization is the first step in finding the eliminable excesses in factory overhead. But suppose the overhead increases are largely the result of fringe benefits on labor? Do we take it lying down? On the contrary, our engineering and methods men

TABLE XXII. COMPARISON OF BREAKEVEN FORECAST AND ACTUAL PLANNED EXPENDITURES FOR FUTURE YEARS

WISCONSIN MANUFACTURING CORPORATION

	Breakeven factors [a]		Step 1, 100% B/E performance [c]	Forecast profit and loss [d]	Step 2, realization to B/E formula [e f]
	Standby per year	Variable cost [b]			
Sales			$2 700 000	$2 700 000	
Cost of sales:					
Direct labor		$10.80	291 600	291 600	100%
Direct material		46.80	1 263 600	1 296 044	97%
Factory overhead [g]	$294 000	12.10	620 582	689 536	90%
Total cost of sales	$294 000	$69.70	$2 175 782	$2 277 180	96%
Gross profits			524 218	422 820	
Selling expense [h]			295 410	310 953	96%
Administrative expense [h]			95 640	106 267	90%
Total selling and administrative			$ 391 050	$ 417 220	94%
Total all costs	$478 500	$77.35	$2 566 832	$2 694 400	96%
Net profit (loss) before taxes			133 168	5 600	
Breakeven point in net sales per year			$2 112 000	$2 670 600 [i]	
Profit pickup		$22.65		$18.86	

[a] Breakeven factors are the standby and variable components made up by departments and accounts. They are summarized here by cost elements in the arrangement of a profit and loss statement accumulated from bookkeeping details.

[b] Variable cost per $100 of net sales.

[c] This column measures the relative deviation from the money which should be spent to maintain, support, and concur with the breakeven allowances as presently established.

[d] A detail of the money requested for the forecast period (one year) by the various department heads adds up to the values shown in this column. The department heads are asking to usurp standard profits by $126 568. This means that they are also asking for a reduction in the profit pickup and an increase in the breakeven point as recorded at the bottom of the column.

[e] Percentage of realization is obtained by dividing forecast (or actual) amounts into the amounts allowed by the variable budget factors constituting the planned breakeven point. Realizations below 100% are unfavorable; they indicate higher costs and an increased going breakeven point.

[f] If sales increase or decrease factors in variable cost column are applied to changed volume to obtain the new standard of performance.

[g] Factory overhead refers to operating expense in the producing units which is usually recovered as a percentage on direct labor. This cost is, however, supported by a detailed departmental control consisting of *time* (standby and variable) factors. In overhead control, the standby and variable elements must be isolated and recorded in each department which spends money if over-all breakeven control is to be effective.

[h] Both the selling and administrative departments are asking for expenditures materially above their past standards and above the amounts now provided for in the planned breakeven point.

[i] To determine the new breakeven point, standby is increased from $478 500 to $503 680 due to 95 per cent realization. Sometimes this would reflect in the variable only. It was assumed in this case for simplicity that the 95% applied equally to the standby and variable.

push for elimination of prime labor costs and greater mechanization, and the whole bag of tricks used to accomplish "cost reduction" comes into play.

Selling and administrative increases cannot be allowed to go scot-free, if only for psychological effect on the rest of the organization. It may be that we are getting "fancy," or have added things "nice to have." There must be assurance that value for the money will be realized in better competitive position or future returns which cannot be expected to appear in the forecast period. Even so, additional functions need not be an alibi for the entire increase. How much can we recover with less costly paperwork? What functions can we drop to make up for new or additional functions we now should add? Go to the standby and variable details in these administrative departments and compare plans with the 100 per cent breakeven realization. This done, the variations which produced a planned 96 per cent realization are detailed and isolated for reappraisal.

There is no need for translating from prior volume to extract changes in performance; the breakeven factors have already taken volume change into account. It is much easier to coordinate department heads' thinking and to impress them with the corrosive action on profits when cost excesses are of the order of so little as 3 or 4 per cent.

The illustration assumes that all the cost increases may be attributable to performance. Were the profit deterioration attributable to a change in the mix of products from long to short margin lines, that fact, too, can be segregated. In fact, that step is assumed as a matter of course before isolation of the performance variations. Such a condition calls for sales direction and engineering action. Improvement of the margin through cost reductions, or price change in short margin lines and changes in selling emphasis, will be called into play.

It is also true that the review of unsatisfactory forecast results may disclose rearrangement projects to fit facilities to a changing business, or maintenance to meet unsatisfactory conditions which may have been building up over a long time. The apparent excesses in factory burden, in selling, and in administration may all be related to new products or other fundamental changes in the business. Such conclusions call for real exercise of the thing called "management."

Management must look cold-bloodedly at the risks involved and reach a positive decision. The decision reached may range from complacent acceptance to highly aggressive action, but listing some possibilities will show how the breakeven-point philosophy can be put to work. Remember that shifting mix of sales from long to short margin lines has been excluded as a reason for the "performance" variation:

1. Acceptance of the planned forecast performance "because our department heads know what they are about" must be challenged. Though such a decision may be rooted in complacency, it is none the less positive in its effect upon the breakeven point and upon profits. We are letting the breakeven point rise to nearly our probable volume—can we be sound and do so?

2. We may find that our original breakeven point of $2 112 000 is 78 per cent of the forecast volume of $2 700 000. In the probable economic weather this is too narrow a margin of safety. Accordingly we instruct department heads that the old breakeven point must be maintained and that no expense which can be eliminated or deferred can remain in their plans; the forecast breakeven point is excessive.

3. Or we may decide that we are now forced to pay the piper for neglect in prior years (or that the planned excesses are good risks for greater gains in the future), and that the excesses will be accepted only to the extent that they are temporary. Immediately we "build fences" around the temporary excesses, as variable excesses over the old breakeven point, as projects to be accounted for. The time zoning of the projects is scheduled, the progress checked, and clear understanding established that when the project is completed or proved ineffective, the cost must be eliminated. The temporary rise in the breakeven point is, so far as we are able to accomplish by continuous check, ensured against becoming other than temporary. Incidentally, this is probably the toughest type of action to carry through to a successful conclusion, but a very effective method in breakeven control.

4. Or we may decide that the performance excesses are not true excesses at all, but rather an increase in organization capacity because we have already invested in some training. To pay for

these excesses and to maintain the same relative breakeven point, sales volume must be forced upward to $3 450 000 (where the profits on the revised breakeven point will equal the profits on the old breakeven point) without added capital expenditure. We may decide to accept the challenge if our sales department can show us how it can get $750 000 of volume above its original forecast without capital plant expenditure and without shortening the margin on any of our products.

5. Or we may decide that none of these actions can be the sole answer and we must employ basic cost reduction in a complex combination of all these possibilities. For instance, half the excess we accept, and half must be made good by extra sales volume. Or, we accept half the projects and then only if additional volume can be found to cover the rest of the "excesses." In any event, we check out our decisions with answers to these questions: Do our plans maintain the same relative (not necessarily the same absolute) breakeven point? Does the resultant variable profit-pickup rate represent nearly the same profitability above the breakeven point? Will the realizable profit be an adequate return on capital employed and on all the extra work and risks we must undertake?

Perhaps the easiest way to show how dynamic forecasting tied in with breakeven arithmetic explains the reasons for profits is by a series of typical illustrations and a discussion of the causes for variation, which fall in three classifications from a management technique and control viewpoint: (1) mix of product, (2) volume of output, and (3) management performance.

1. *First Cause of Profit Variation: Mix of Product.* "Mix of product" refers to the gross margin by lines and the relationship of high-margin product lines to low-margin lines constituting the sales during an accounting period. In a business having three lines of product there may be one with a normal 10 per cent gross margin, another with a normal 20 per cent gross, and the third with a normal 30 per cent gross margin. It may be planned, or past experience may indicate, that each product line should contribute one-third of total business. With such a product mix, the average gross margin for this company would be 20 per cent. In one specific month, however, the 30 per cent line may make

up 50 per cent of the total business; conversely, the same line in another month may make up but 10 per cent of the total. Such swings in sales mixture can extinguish profits or handsomely augment profits even though total billings remain constant. Unless isolated and measured, changing product mix confuses profit control and understanding. To illustrate:

What happens if the company gets $2 700 000 sales but the mix between products materially varies? Previously, it was indicated that the sales were forecast or projected at $2 700 000 for the next year. These sales by lines are $1 215 000, Product A; $675 000, Product B; $810 000, Product C. Suppose that during the forecast period, the total sales do not change materially but that Products C and A reverse themselves so far as sales are concerned. What difference will this make on the calculations of profits and on the breakeven point?

The sales on which the existing breakeven was built were based on individual variable costs. The weighted average of these costs in the existing breakeven point as illustrated was $77.35. If the planned or forecast sales changed the internal mix of the products involved, even though it had not changed the composite total sales, the reweighting to a new variable is the result of applying the planned sales by product times the individual variables. Based on the question just put, the weighting on the planned sales changes the variable from $77.35 to $78.14. This is an increase of the variable cost of $0.79 per $100 of sales. If the forecast refers to $2 700 000 sales per year, the loss of profits due to mix of products would be $21 330 ($2 700 000 × $0.79). Such a shift in product mix increases the breakeven point from $2 112 000 net sales per year to $2 189 000 and reduces the variable pickup by $0.79 per $100 of sales as explained above.

2. *Second Cause of Profit Variation: Volume.* Volume plays a tremendous part in profit making. Many times management is misled because a 16 per cent profit ratio seems fabulous when compared with past and lower-volume periods. The important thing is, however, how efficient were the operations producing this particular profit at this particular volume? Should the profit be 10 per cent or should it be 30 per cent? Present methods of accounting and costing do not do a good job of exposing or explaining. To illustrate: Company X has the following costs:

standby costs, \$600 000 per year; variable costs, 40 cents per \$1 of sales; breakeven point, \$1 500 000 net sales. Present sales volume is \$6 000 000 yearly. Therefore,

$$\$6\,000\,000 - \$1\,500\,000 \times 40 \text{ cents} = \$1\,800\,000 \text{ profits before tax}$$

$$\% \text{ profits to net sales } \frac{\$1\,800\,000}{\$6\,000\,000} = 30 \text{ per cent}$$

At \$3 000 000 annual sales, a 20 per cent pretax profit rate is as good a price-cost control job because it meets the breakeven goal of \$1 500 000. Note: \$3 000 000 – \$1 500 000 sales above the breakeven × 40 cents on each sales dollar = \$600 000, or 20 per cent.

While the rate of profits seems "high" at 30 per cent, to sustain a loss at \$6 000 000 sales means that the breakeven point has increased. The variable gain picked up above the breakeven point may have decreased or the standby drastically increased. To illustrate:

What happens if planned volume changes during the forecast period? With projected sales remaining in the planned internal proportions but rising or falling from the planned level, what happens to profits and the breakeven point? If sales were to fall \$300 000 below the forecast, but hold the planned proportion by product lines, the results would appear as given in Table XXIII.

From the above it can be seen that a one-ninth reduction in volume has reduced profits by more than half. But one more thing is important. Have the cost factors been reduced to support the revised and lowered level of activity? The answer is "Yes" so far as the variable costs are concerned, since the forecast variables are the same per dollar of sales before and after the volume reduction; i.e., \$77.35 per \$100 net sales. Since they apply to less sales (reduced \$300 000), allowed costs are less, (\$300 000 × \$0.7735).

Herein lies the crux of the difference between a static forecast and using a forecast built on the dynamism of standby and variable budget factors. Under a static forecast the impulse for all reduction of spending rates must come from the top because

TABLE XXIII. REDUCTION OF PROFITS DUE TO LOWER VOLUME

	Product A	Product B	Product C	Total
Revised projected sales	$1 080 000	$600 000	$720 000	$2 400 000
% of sales to total	45.0%	25.0%	30.0%	100.0%
Variable per $100 net sales	$79.37	$64.91	$84.66	$77.35
Total all costs, including standby	$1 019 936	$531 560	$738 272	$2 334 768
Profit before taxes	$60 064	$68 440	($63 272)*	$65 232

$133 168 projected breakeven profit on $2 700 000 sales †
65 232 projected profit on $2 400 000 sales

$ 67 936 profits lost from falling off of volume

* Loss.

† See Table XXII.

Check of profits lost = reduction of sales $300 000 × $22.65 = $67 950.

each department head takes his static expense forecast as a license independent of volume declines. If volume increases, he knows that he can always "get more money." In contrast, the variable allowance in each department head's budget automatically breathes, rises and falls, with volume. He is always on notice when curtailment is necessary, or when expansion is reasonable. Responsibility for managing his share of the business is fixed and defined in terms of cost dollars before the fact and automatically with changes in fact.

The effects of rising volume can be found by the same process illustrated above.

3. *Third Cause of Profit Variation: Cost Performance on Any Given Volume.* No real sophistication in profit understanding (which seems unimportant when profits reach a high percentage) can be attained nor can a real approach to profit correction be made unless the profits projected at planned rate from a planned breakeven point are compared with the profits attained on the actual performance being measured. To illustrate: The breakeven plan may have projected $100 000 or 10 per cent net before

tax on $1 000 000 of sales. If only $50 000 profit were realized, planned costs of $900 000 have increased to $950 000. Performance measurement means detailing these cost variations of $50 000 and tracing them down to operating departments where corrections can be made.

Assume that the machine shop spent overhead of $5 131 on direct labor of $24 507 for a given period. If the standby and variable factors for this direct labor output are $4 870, then this department has a realization of only 95 per cent and has contributed, temporarily at least, to the delinquency of the breakeven point by $216. Similarly, if the total factory spent $54 146 and the standby and variable allowances aggregate only $49 392, the 91 per cent realization would account for a loss due to performance for the period in question of $4 755.

From a forecast point of view the interest is in the question, what effect does this variation in costs have on the breakeven points? The answer can readily be calculated: the forecast pickup in profits above the breakeven point in this company is $22.65 per $100 of net sales. Since the costs are in excess of the breakeven allowance as determined by the standby and variable factors for the period in question by $4 755, the going breakeven point has risen $21 000 per month above that accepted in forecast plans.

On a yearly basis, the annual breakeven point of the Wisconsin Manufacturing Corporation would rise from $2 112 000 to $2 364 000 net sales to reflect the 91 per cent realization appearing in the departmental control sheets. The costs of each department are watched, evaluated, and controlled, as the costs, profit, and going breakeven become reality.

In like manner, any other division of the company may incur costs above or below the standby and variable allowances for any given period of time. The collective composite of these variations can and should be reported in terms of effect upon the breakeven point due to performance. These individual variations are recorded in the summary form on the profit and loss statement for management not only to express the variations in breakeven points as illustrated above, but to reconcile actual net profit to plans for any given period of time. Failures to meet breakeven costs can be detailed on the profit and loss statement by functions and traced back to details of departmental responsibility.

The Importance of Standby and Variable Factors in Forecasting. While standby and variable factors are not in themselves budgets or forecasts, they are the necessary factors in *time* subdivisions for preparing these measures of planned or actual results. Uninformed people say, "If you budget, you do not need these factors," thereby missing the point completely. Standby and variable factors are the wherewithal to move dynamically under changing conditions without losing sight of original basic aims in the process of measuring changed conditions. Profit variation due entirely to volume changes will be separated and distinct in profit and loss interpretation. The major advantage of standby and variable factors is flexibility in giving organized explanations of unpredicted variations which develop during the scope and time of the forecast. Nothing is lost of the value of the original forecast goals as actual results are broken down into their cost details.

Standby and variable factors make forecasting dynamic and tie in the breakeven concepts with the controls at the cost center level.

Use of Forecasting to Control Costs. A forecast is useful as a guide only if it can be related to actual results in detail. Its purposes are

1. To present in proportion the plans and the thinking of an organization for some future period.
2. To give top management a chance to review and evaluate these plans as they accumulate from many sources and under constantly varying conditions.
3. To give top management a chance to accept, revise, or suggest changes in these plans and set an evaluated program to accomplish the approved goals.
4. To set up guide posts against which actual results can be checked so that when the forecast period is over, management will not be ashamed to compare plans with the actual results.
5. To define factors of variability by each cost-control segment which makes it possible to adjust the forecast if conditions change during the forecast period.

Forecasts are often made under great pressure just before the start of the fiscal year, too often used for a few discussions, and placed in a desk drawer and soon forgotten, with the result that the real purpose of forecasting a comparison of basic plans with probabilities is lost. As a forecast period unfolds into reality with all its unpredictable variations, a constant adjusting of the forecast is required. The ease with which this comparison can be carried into the hinterlands of control improves the chances of using the forecast for a constructive purpose and for reducing the most violent usurper of profits, *lag*. Nothing is more important than that the forecast be used intelligently during the period under review and as that period becomes history.

Comparing Forecast Breakeven Profit and Loss with Actual Results. It is important in interim accounting, whenever a profit and loss statement is prepared, to isolate the items which vary from breakeven norms. For example, the following items were extracted from a company's monthly profit and loss statement and illustrate this application:

VARIATIONS FROM COST AND BREAKEVEN STANDARDS

Material price variation	$1 075.00
Labor variation	118.00
Underabsorbed burden:	
Due to volume *	3 210.00
Due to performance 91% realization †	4 755.00
Loss due to mix ‡	1 207.00

Total cost of above variations from breakeven standards equals $10 365.

* Because volume was less than that assumed when the normal rate of burden used in costing was established, the loss in profits was $3 210.

† Performance in the operating units on the expenditure level was poorer than that planned by $4 755.

‡ Because actual sales vary in proportions of the several products from the mixture assumed in forecast sales, profits were lower than planned by $1 207.

This loss of profits of $10 365 also means an increase in the going breakeven point over forecast breakeven point of $45 800 ($10 365/$22.65 = $45 800).

The main consideration here is that the process of supporting all variations from normal which usurp profits are detailed and isolated to lines of authority where control is possible. The profit and loss analysis shown above summarizes what has happened and gives a proportion of value for future planning decisions.

Conclusion. To forecast is to look ahead. What should be forecasted in detail depends upon the importance of the item. The forecast, the breakeven controls, and reported results must recognize like elements of cost and like centers of cost responsibility if variations from plan are correctly to be evaluated. Correction of variations requires separate recognition of their sources: product demand or sales emphasis, volume, or performance.

CHAPTER 13

THE USE OF CAPITALGRAPH FACTORS IN FORECASTING CAPITAL REQUIREMENTS

Introduction. Preceding chapters have described the process of establishing float and variable factors for the several categories of assets and liabilities of the balance sheet. Collectively, these factors are called the capitalgraph.

Ordinarily it is a difficult job to forecast or project the capital requirements into a future period. Scores of assumptions must be made in addition to that of probable sales volume and price structure. The purpose of this chapter is to demonstrate how the capitalgraph reduces the process to one of considering the probability and necessity for variations from the planned pattern. The principle of management by exception is applied to capital forecasting in much the same manner as it should be applied to the appraisal of current operating results.

The Operating Capital Forecast. Regardless of the method employed, any consideration of future capital requirements is largely concerned with two principal elements:

1. *Working Capital.* The working capital requirement to be forecast fits, in general, the usual accounting and balance-sheet concept of working capital.

That is, working capital is current assets including cash and equivalent investments, receivables, and merchandise inventories, less current liabilities including trade payables and working expense accruals. The working expense accruals include accrued payroll, payroll and local taxes, and the like.

Excluded from the current liabilities, for operating capital forecast purposes, are loans, notes payable, and income-tax accruals. The latter items are handled as sources of operating capital.

2. *Fixed Plant.* Land and buildings and equipment net of

accrued depreciation and amortization comprise the second element of the operating capital requirement to be forecast.

Stated in terms of *time,* the forecast of operating capital is concerned with values having widely differing rates of turnover. The working capital section may turn over several times during the year as the purchase of material and labor to convert to product to be sold and collected for progresses. The fixed-plant section is concerned with values brought into the business for long terms at irregular rates and in irregular amounts, depending upon the physical capacity required for the volume of output to be handled.

Sources of Operating Capital. Where does operating capital come from? From what sources can the forecast assume the operating capital requirement will be met?

Here again the dynamic facts of business operation depart from traditional accounting concepts. As a practical matter, operating capital required to handle a given sales volume may be something more or something less than net worth. Nor are we concerned primarily with accounting when we make forecasts of operating capital; we are very much concerned with finding the money to run the business at the rate of output indicated by the forecast of sales.

Let us see where the money really does come from, and we find again a natural division between long- and short-term sources:

1. Long-term Sources of Operating Capital

a. Net Worth. Original and subsequent equity investments of owners *plus* retained earnings not distributed as dividends.

b. Long-term Debt. Debt may range from perpetual debentures which need never be paid off except at liquidation down through the various types of secured or mortgage loans to credits under contract to be repaid within specified terms of years. Any standard text on corporation finance elaborates these forms in great detail; for convenience we classify as "long-term" that debt which need not be paid off sooner than a year.

2. Short-term Sources of Operating Capital

a. Noncash Cost Accruals. Accruals for depreciation and amortization in excess of current cash outlays, and accruals for payments which must be made but once a year as with pension trust payments, insurance premiums, and possibly certain local taxes.

b. Income-tax Accruals. This has been a real source of temporary operating capital, but the period of availability to the business has been, and will be, progressively shortened.

c. Short-term Borrowing. For convenience, borrowing due for repayment in less than a year is classed as "short-term" even though it may have originally been "long-term," and accounting would not transfer classifications until the end of the fiscal year.

Since the capitalgraph will indicate how much operating capital is required for a given volume of output, the first step is to determine whether or not the business now has a sufficiency or a deficiency of operating capital. If there is a deficiency, the next step is to choose among the sources and appraise our ability to draw upon the particular source. Before working out an example to demonstrate this process, however, further consideration should be given to the character of each of the sources just enumerated.

Net Worth and Retained Earnings. Net worth, including original and subsequent equity investment and that portion of operating profits retained in the business after income taxes and dividends, may or may not be equal to forecast required operating capital. If there has been a period of rapid growth, it is very likely that the forecast will disclose a deficiency.

On the average, American manufacturing industry must look to sources other than retained operating profits to finance increasing levels of business. As has been shown previously, the average manufacturing business requires $22 of operating capital for each additional $100 of sales output. The average profit rate above the breakeven point is $18.80 per $100 of sales. It is obvious that a 50 per cent tax rate leaves but $9.40 of permanent capital or capital expenditures in excess of depreciation to finance still more sales even without reductions by dividend payments.

Additional equity investment is often more readily thought about than obtained, as the existence of the fraternity of investment houses will attest. To attract equity capital in large amounts requires some assurance that a fair return can continue to be paid out as dividends on the additional shares. Where there is any doubt that the higher rate of output can be sustained, there is a natural tendency to be very slow and careful in selecting this means of increasing operating capital.

From the standpoint of profit management, substantial increases in net worth have these characteristics:

1. Preferred-stock issues, where the dividend is to be cumulative, suggest that management is confident of always operating substantially above the breakeven point.
2. Increased equity investment implies, and most often is used for, additional productive capacity. Additional capacity means greater standby costs, both in physical facilities and in organization structure. Any increase in standby, unless there is offsetting reduction in variable costs, automatically raises the breakeven point. It may well be that something less than the projected generation of operating capital from retained earnings will result, and the amount of equity financing may fall short of true requirements.

Long-term Debt. Management undertakes a double-edged responsibility when operating capital needs are supplied through any incurrence of debt, long- or short-term. The interest charge on debt may seem a lower "cost" than equity financing because the profit task in the shareholder's eyes is raised the least. On the other hand, added interest charges increase the breakeven point in themselves as they increase the standby factor of costs.

There is also the hard and unpleasant fact that debt must be repaid, at least where convertibility into stock is not a feature of the indenture. The use of long-term debt for supplying immediate operating capital requirements can well be analyzed from the point of view of anticipating the growth of capital through retained earnings. Assuming a 50 per cent dividend policy, the previously cited American manufacturing corporation posttax profit average of $9.40 per $100 of sales above the breakeven point is but $4.70. When matched against the variable operating capital requirement of $22.00 per $100 of sales, $4.70 allows a certain rate of growth. The rate is 21.35 per cent per year in sales above the breakeven point ($4.70 ÷ $22.00 = 21.35 per cent).

Compounding this rate of growth annually allows determination of the number of years of continuous growth in which retained earnings can retire a given amount of debt. Of course, the actual term of the loan must be considerably longer to offset the withdrawal of operating capital as the debt is paid off. An advantage of debt is that it can always be paid off should forecast need not materialize. In many respects, this is often an advantage over equity financing.

Noncash Cost Accruals. Noncash cost accruals are probably the shortest of the short-term sources of operating capital. This is the way cost accruals can contribute to operating capital.

Depreciation is charged off against operations each month or accounting period. If current expenditures for replacement plant items are less than the amount so charged off, the effect is to increase cash by the amount of that deficiency. This condition frequently makes its appearance in the wake of a large plant-modernization program, and as such it is a legitimate source of working capital. Unfortunately, advancing price levels and the risk of impairing the capacity and efficiency of the plant over a long term make it a dangerous source. The danger is so great that for any long-term projections it is usual practice to assume that depreciation accruals will be spent in replacement substantially as they appear in the accounts.

To a lesser degree, the same availability of operating capital appears where accruals in cost do not entail actual cash outlays except at definite and widely separated points in time. Many pension funds receive their deposits but once annually. There may be but annual payments of local taxes and insurance premiums. Prior to the actual cash outlay, the effect of these widely separated payments is to supply temporary operating capital. Since they are a form of debt, like debt they must be paid at definite times. At such times the business finds a sudden shrinkage in its cash balances reflecting the withdrawal of the operating capital they have supplied.

If there is doubt that cost accruals do not have a significant effect on the availability of operating capital, check the operation of your reserve for annual vacations. Many treasurers watch their cash carefully as the annual vacation shutdown approaches and will admit an uncomfortable cash position immediately after the vacation period until earnings can replenish the cash reservoir.

Income-tax Accruals. To the executive whose corporation has been able to discount its tax liability by funding it with interest-bearing investments, it may be a shock that the income-tax accrual could be considered a source of operating capital. To the hard-pressed treasurers of less fortunately situated companies, however, it will not be a shock; rather, it is a description of a hard necessity. A brief historical review of the timing of income-tax payment dates, relieved of the complication of fluctuating rates, brings the matter into proper perspective.

In the days before 1950, now dead beyond recall, income-tax payments on a year's earnings were spread over the four quarters of the *following* year. The full amount of the tax accrual remained in the business as available operating capital for more than a year, on the average, from the date of the accrual. When sales and profits before taxes were rising, and so long as the rise continued, practically the full gain ($18.80 per $100 of sales in the average case) on additional sales was available to finance further growth. If profits, and therefore income taxes, leveled out, there would have been continuous support for the sales growth realized.

Then global strategy and Fair Deal economics so enlarged the need for tax income that the Mills Plan for the acceleration of corporate-tax payments became law. By 1955, the entire year's tax liability was to be paid in the *first half* of the following year. This acceleration of payments not only reduces the average time of availability as operating capital by a third, but also means a sharp reduction in operating capital in the first half of the following year. The reduction, assuming continued rate of profitability, is equivalent to at least a quarter of the income-tax liability in each of the first two quarters.

It is more than probable that the general business uncertainty in the early months of 1953 and 1954, with scurrying to reduce inventories and improve cash positions, was rooted in part in the realization that cash liquidity was not only desirable but downright mandatory. Thus it appears that *timing* of tax payments, and of sources of operating capital, can have a depressive influence on the economy as a whole as well as upon the fortunes of a single company.

Nor is this the end. An extension of the Mills Plan, proposed in the 1954 tax bill, would advance the timing of tax payments still farther. In the next few years if the present proposals are carried out, estimated taxes on first-quarter earnings would be payable in September, and so on, quarterly. It seems a certainty that this acceleration of tax payments will be enacted in 1954 or soon thereafter.[1] As a source of operating capital, the average availability of income-tax accruals will then be cut to six and one-half months when the entire corporate-tax payment will be on such a current basis. It is questionable that tax accruals will have any practical usefulness as a source of working capital in many industries.

The practical end of trading on the income-tax accrual can be boiled down to these significant effects:

1. For those companies whose capital position has not allowed funding of the tax accrual, income taxes accrued are a quick measure of the additional operating capital that must be supplied to support the same level of volume at the same rate of profitability.
2. Whenever there is a falling off in volume, cost-control action must be faster and more effective than ever before to prevent *lag* from eating up the ability of the enterprise to recover its sales and cash position.

Short-term Borrowing. The essential difference between short- and long-term borrowing lies in the timing, that is, the timing and duration of the need, and the timing of repayment as capital from other possible sources is generated to take over the need or as the need itself passes.

Where the short-term borrowing has the nature of traditional short-term commercial paper in its application to needs, the cost of the loan approaches a true variable cost. As such, its effect on the breakeven point is but slight and may be transient.

From a forecasting point of view, seasonal considerations become dominant, and underlying trend has less influence in the decision to draw upon this source of operating capital. The period of the forecast must be broken down more finely, say into months and quarters, so that withdrawals of operating capital because of payments of accruals and taxes can be fitted in with the loan repayment dates. Needless to say, any lender will be more willing to lend against general credit if there is evidence that the timing has been well worked out before any application for a loan is made.

Application to a Specific Situation. The first step, of course, is to find out how the company stands with respect to forecast activity and capital availability. Capital presently available is the resultant of all that has gone before: past profitability, past dividend policies, past efficiency in managing capital. The fact that there has been developed a plan of capital management which is summarized in a capitalgraph cannot change the past. And seldom will it be found that compared with the capital plan the present balance sheet will line up exactly "right."

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[1] Acceleration of tax due dates is a feature of the 1954 law, subject to estimating exemptions pertaining only to an enterprise of about the same size or smaller than our example.

For purposes of demonstration, it is necessary to make a few assumptions that can be used to illustrate a possible situation in the affairs of the Wisconsin Manufacturing Corporation previously cited. The assumptions are these:

1. The corporation, after careful examination of its capital response to volume, has determined that its operating capital requirements are a float or constant of $800 000 plus $19.36 per $100 of sales.
2. The corporation has demonstrated, and the management intends to maintain, a rate of profitability above its breakeven point of $2 112 000 annually of $22.65 per $100 of sales above the breakeven point.
3. Income taxes will be at a 50 per cent rate, payable in the first half of the following year, and the corporation expects to pay out as dividends approximately 50 per cent of earnings after taxes in the last quarter of each year.
4. At end of a year in which sales aggregated $3 000 000, spread fairly evenly over the year, the management is contemplating a sales forecast of $4 000 000. With budgeted rates of plant investment additions, the corporation's physical facilities have a capacity of $6 000 000 of output before it would be necessary to enlarge existing buildings and structures. The forecast by quarters is as follows:

Quarter	Billings	Annual rate
1	$ 750 000	$3 000 000
2	750 000	3 000 000
3	1 000 000	4 000 000
4	1 500 000	6 000 000
Year	$4 000 000	$4 000 000

5. The current actual balance sheet and the balance sheets projected on the basis of the planned operating capital capitalgraph are compared in Table XXIV.

TABLE XXIV. ACTUAL AND CAPITALGRAPH YEAR-END BALANCE SHEETS WISCONSIN MANUFACTURING CORPORATION

Balance sheet	Capital factors		Assumed actual	Capitalgraph projections, varying annual rates of sales		
	Float	Variable				
Item/sales rate	**Any**	**$100**	**$3 000 000**	**$3 000 000**	**$4 000 000**	**$6 000 000**
Cash and equivalent	$ 50 000	$ 3.37	$ 130 000	$ 151 100	$ 184 800	$ 252 200
Receivables	50 000	8.05	280 000	291 500	372 000	533 000
Inventories, net	150 000	12.60	650 000	528 000	654 000	906 000
Current assets	$250 000	$24.02	$1 060 000	$ 970 600	$1 210 800	$1 691 200
Current liabilities	75 000	7.04	330 000	286 200	356 600	497 400
Working capital	$175 000	$16.98	$ 730 000	$ 684 400	$ 854 200	$1 193 800
Plant assets, net	625 000	2.38	720 000	696 400	720 200	767 800
Operating capital	$800 000	$19.36	$1 450 000	$1 380 800	$1 574 400	$1 961 600
Tax accrual @ 50%: illustrative rate *			$ 101 000	$ 100 800	$ 214 050	$ 440 550
Retained net worth: managerial decision			$1 349 000	?	?	?
Quantitative operating capital position: measurement basis				$ 69 200 long	Short $ 124 400	Short $ 511 600

* Projected forecast profitability based on breakeven forecast. Breakeven volume: $2 112 000, at current level of sales prices. Gain above breakeven: $22.65 per $100 of sales.

Appraisal of the Specific Situation. The operating capital position displayed in Table XXIV gives the outside limits which must be dealt with in planning fiscal operations over the year of forecast. It is evident at once that, quantitatively, present operating capital is adequate to support the $3 000 000 annual rate of sales forecast for the first half of the new year. In fact, the corporation has some $69 000 more than projected requirements. There are shortages, however, to be made good before volume can rise to the $4 000 000 and $6 000 000 levels.

Investment in plant does not present any important problem. Its statistical adequacy indicates that not until the fourth quarter will there be need for additional investment over and above reinvestment of usual depreciation accruals.

Qualitative analysis of working capital, however, discloses conflicting influences. Cash is on the short side at a time when current liabilities are above normal relationships and collection rates have apparently been somewhat better than normal. Inventories have been allowed to become overblown since they are sufficient to support a $4 000 000 annual rate. Cash and receivables, the really liquid current assets, on the other hand, are below the planned levels for a $3 000 000 rate of business.

This situation is not uncommon, and we can imagine numerous causes. A dividend has recently been paid out, working expense accruals have piled up because bonuses and pension-trust payments are not payable until January, and the edge may have been lost from the inventory control program because working capital was relatively plentiful for the $3 000 000 rate of operations. Since it will soon be common knowledge in the organization that third- and fourth-quarter operations are scheduled at considerably higher rates, there will be resistance to melting down inventories in the first half. This resistance will be greater in proportion to the extent that the excessive inventories represent work in process instead of raw materials.

A further aspect of the situation lies in the quality of the excess over capitalgraph requirements. It is true that there is an overall excess of $69 200 of operating capital. Of that amount $23 600 is sterilized in plant and $45 600 is in working capital. Unfortunately, nearly all that amount, or $43 800, is derived from an excess in current liabilities. The net effect, therefore, is that the corporation has been financing operations out of its working expense accruals and drawing on its general credit with suppliers.

The overblown inventory situation now takes on a new importance as a possible source of relief to correct the working capital situation. Each case varies, and in each case the coordination of capital requirements and of operating efficiency becomes the essence of the problem. If the current rate of manufacture were in pace with the $3 000 000 shipping rate, a slowdown to reduce inventory would complicate management problems in several ways. The overhead organization would have to be reduced as well to maintain operating efficiency. But the forecast indicates that in the third and fourth quarters there must be an increase in manufacturing rate. Both to avoid the management burden of a staff reduction and to hold the inherent profitability rate, it might well appear that the manufacturing rate should be maintained. In that case, the condition of the raw-material stocks would be open to question.

We shall assume for the purposes of this illustration that the raw-material stocks are in such condition that a slowing of purchasing can reduce the total inventory by as much as $50 000 in the first quarter. This is not an unreasonable figure; the amount of the current liabilities suggests that the corporation may have overbought. Further, in periods of rising price levels there is a strong tendency to overbuy on the theory that the excess is "as good as money in the bank." The truth of the matter is that raw materials bought in excess of needs never are that good. Costs of record keeping, stocking, and handling represent, over a year, a substantial discount from the purchase values.

The capitalgraph appraisal of this situation places the fiscal management problems in high relief:

1. *The first half of the forecast year:* fiscal management must be directed toward *improving the quality of the operating capital. Additional* operating capital is needed in these categories:

a. Cash	$21 100	
b. Receivables	11 500	
c. Reduction of liabilities	43 800	$76 400

Sources of operating capital are as follows:

a. Reduction of raw-material inventories	$ 50 000	
b. Income from operations:		
Projected net from operations, before tax	100 800 *	
Less prior year taxes paid, assumed to be payable entirely in first half	101 000	
	($200)	
c. Excess of depreciation accrued over replacement investment (probable)	None	$49 800
Effective operating capital shortage to be met by executive decision		$26 600

* For six months: Accrued taxes $50 400
Current earnings 50 400

Possible methods of supplying this deficiency:

a. Minor curtailment of manufacturing if finished-goods inventories will stand the drain.
b. Operating more closely with cash; maintaining closer control on raw-material inventories than $50 000 reduction suggests.
c. Continuing to lean on suppliers.
d. Bank credit. This source should be avoided in view of the demands of the third and fourth quarters.

2. *The third quarter:* fiscal management must be directed toward supplying *additional operating capital* to support the scheduled third-quarter shipments of $1 000 000 equivalent to an annual rate of $4 000 000.

In every balance-sheet category, the operating capital requirement for $4 000 000 annual rate exceeds the values in the assumed actual balance sheet at the beginning of the year. Therefore, as Table XXIV indicated, on both a quantitative and a qualitative basis, additional operating capital must be provided to the extent of $124 400.

Had the forecast of $4 000 000 been spread evenly over the year, this additional $125 000 would have been required immediately at the first of the year. Delaying the increased output until the third quarter also delays the operating capital requirement.

As was shown in the discussion of the fiscal management problems for the first half of the forecast year, the net difference between income-tax payments and operating profits contributes nothing to the additional capital requirements of the third quarter. The situation, assuming maintenance of the forecast profitability, looks like this:

Additional operating capital to be obtained:	
This amount includes the $26 600 of working capital shown to be needed in the first half.	$124 400

Possible methods of supplying the deficiency:

a. It is assumed that no income-tax payments need be made; should the law have been changed to further accelerate payments over the 1954 pattern, $25 200 (half year-to-date accrual) must be added to the deficiency stated above (ignoring estimating exemptions of 1954 law).

b. Operation on lower-than-planned working-capital requirement. Because lead times must be allowed in building up to fourth-quarter output rate of $6 000 000, the benefit from this source is probably.. Negligible

c. Income from operations.
Operating net before income taxes, assuming projected profitability for the third quarter, will be $107 000. Since this amount will have been earned in monthly increments, it will not really be available except as an offset to the lead time for raising the operations to the fourth-quarter rate of $6 000 000 annually.

d. Bank credit seems to be the logical source of.............. $124 400

3. *The fourth quarter:* fiscal management must be concerned with supplying *still more operating capital* to support the scheduled shipments of $1 500 000, an equivalent annual rate of $6 000 000. Compared with the balance sheet at the beginning of the year, the additional operating capital required will be $512 000.

There is also the dividend consideration at the end of the year. The earnings projection is as shown in the accompanying table.

Quarter	Sales billed	Net after tax (50% assumed)
1	$ 750 000	$ 25 200
2	750 000	25 200
3	1 000 000	53 515
4	1 500 000	110 135
Year	$4 000 000	$214 050

Were the dividend policy on the basis of 50 per cent of earnings (after taxes), the forecast would schedule a dividend disbursement of $107 000 in the fourth quarter. Quarterly payments, of course, being a withdrawal of operating capital, would have increased the deficiencies of the previous quarters. The fourth-quarter situation, as forecast, summarizes as follows:

Additional operating capital needed over start of year			$511 600
Sources of operating capital:			
a. Presumed to have been obtained for third-quarter additional requirements		$125 000	
b. Income from operations, three quarters:			
Income tax accrued @ 50%	$103 915		
Profit carried to surplus	103 915	207 830	$332 830
Net deficiency at start of fourth quarter			178 770
Third-quarter borrowing			125 000
Total deficiency at start of fourth quarter			$303 770
Fourth-quarter income from operations:			
Income tax accrued @ 50%		$110 135	
Net carried to surplus	$110 135		
Less annual dividends	107 000	3 135	$113 270
Net deficiency in operating capital at year end			$190 500

And Then What? So we have brought our forecast, well spaced out, to the end of the fiscal year. There must be some borrowing to help over the last half of the year. According to the figures, the borrowing must be $125 000 to support third-quarter plans, and if sales forecasts are realized, there must be an increase in borrowing to $304 000 for the fourth quarter. At year end, however, it looks as if the borrowing could be reduced to something under $200 000.

A prudent management would not be content; it would still pose the question: and then what? At this stage, the forecast need deal only with broad limits; relatively little must be added.

1. What then will be the probable course of sales? No sales manager pushes up his volume with the intention of surrendering his gains. Therefore, with present physical building and structure capacity, checks should be made on one or two assumptions. Let us suppose that the $6 000 000 rate can be maintained, and also that there might be a falling off to, say, a $5 000 000 rate.

2. Since the year is scheduled to reach practical capacity, there should be some consideration of the projected plant investment which theoretically will produce $6 000 000 of annual sales but may become unbalanced as capacity is reached. Excessive investment may be needed for rebalancing purposes.

Extension of the Forecast. Just beyond the year forecast come possibly changed sales volumes and income-tax payments. The extension of the forecast to rough out the broad limits of consideration is given in Table XXV.

TABLE XXV. EXTENSION OF OPERATING CAPITAL FORECAST FOR VOLUME AND TAX PAYMENTS

WISCONSIN MANUFACTURING CORPORATION

	Alternative projections	
Assumed possible annual sales rates........	$6 000 000	$5 000 000
Year-end deficiency forecast, above........	$ 190 500	$ 190 500
Prior-year tax payments due..............	214 050	214 050
Gross deficiency to be provided............	$ 404 550	$ 404 550
First-half projected net, before tax.........	440 550	327 300
Capital released by lower volume:		
Working capital @ $16.98 per $100 of sales	None	169 800
Plant..............................	None	Probably none
Total first-half capital generation..........	$ 440 550	$ 497 100
Excess over year-end deficiency............	$ 36 000	$ 92 555

Table XXV throws some more light on the question: and then what? It is apparent at once that the year-end deficiency in operating capital of $190 500 will carry over into the year beyond the forecast for nearly six months. The timing of the loan arrangements, entered into at the beginning of the third and fourth quarters of the forecast year, must take that fact into account. Should there be still further increase in volume, $170 000 for each million dollars of annual rate will be needed.

It is also apparent that maintaining profit efficiency not only develops the capital needed for still more volume, but also is more productive of free capital in the long run. In this case, however, the forecast tells us that the corporation is about to strain at the seams of its physical capacity. What about the plant investment?

Forecasting Fixed Plant Expenditures. In Table XXV, no release of operating capital was estimated to be derived from a drop in volume from $6 000 000 to $5 000 000 annual rate. If the drop in volume is of short duration, it is not practical to expect that there will be any significant release in operating capital from excess of depreciation charged over replacing plant investment.

Justification for plant investment is a separate subject, to be covered in Chapter 19. At this point, only the effect of decisions to invest in plant upon the forecast of operating capital requirements is considered.

From a capital point of view, expenditures for so-called fixed plant fall into two general classes:

1. Maintenance of capacity within the usual operating ranges
2. Expansion of operating capacity

Any particular plant-investment project will seldom be clearly of one class or of the other. There will be shadings of degree to which a particular proposal can be classed as "maintenance of capacity." Where it is truly an "expansion" project, there is little need for debating its purpose.

Maintenance of capacity projects within the usual operating range is primarily replacement of plant and what is meant when it is said, "We should spend our depreciation." The underlying idea is that failure to spend depreciation accruals represents an erosion of basic capacity.

In a mature plant, where assets have been about half depreciated, it should be possible to distinguish clearly just what is being done in the matter of holding on to the basic capacity that has been established at some time in the past. Unfortunately there are distorting and confusing influences at work. The most obvious is the effect of price levels, and a close second is the answer to the question, "Just what is capacity?"

If the variable rate found for plant assets in the capitalgraph is correct, then we have the anomaly of a flat depreciation charge per period and a variable rate over and above a constant for original cost less depreciation.

Somehow the flat depreciation charge of bookkeeping and a variable rate for plant investment do not seem to go together. The truth is that convenience, tradition, and accounting practice have blinded us, and the flat charge or standby concept is overweighted in our thinking.

Perhaps there are twenty milling machines in the shop, all in about the same class of work range. Obviously it is not necessary to have so many in good working order when we are producing at the rate of 2 million dollars of sales as when the production pace is geared to 4 million dollars. There is a strong tendency to follow the sales forecasts on replacement; purchases are deferred on the low side. From this kind of decision arises the variability seen in the capitalgraph for net plant assets.

There is also the effect of advancing technology and changing product. If we are keeping up with the best methods in manufacture, and efficiently designing the product, capacity is increasing constantly. The walls of the buildings are not a limitation on this kind of capacity increase. As we replace, as we spend the depreciation accrued, we may actually be buying greater capacity. Such increases are small in rate and very uneven in their progression.

Price level has its influences as well. If in 1954 it were decided to replace machinery and equipment only six years old, on the average, 45 per cent would have to be added to the cost of the replaced unit. On the other hand, neither does the price level stand fixed for the products produced on those machines; the variable rate found in relation to the manager's own sales has the benefit of about the same stretch or contraction in his selling prices as in the increases in the price of equipment he must buy.

As a general proposition, then, and warning must be taken that it is a very general proposition, the capitalgraph rate indicates maintenance of operating capacity within the usual operating range—the range in physical units to which the plant has been accustomed. The problem in forecasting this kind of capital expenditure is entirely a matter of relative timing. How will purchases of equipment lead or follow the accumulation of depreciation?

Expansion beyond usual capacity, however, is quite a different matter. The need for added capacity may arise from an increasing demand for the same products, or from the requirements of entirely new products. Unless it is known that there is already more floor space than really needed, major rearrangement and brick and mortar projects signal moves to change fundamental operating capacity.

This kind of capital equipment investment is not provided in a capitalgraph based on historical characteristics nor in the usual operating capital plans. Such requirements are crystallizations of the need for equity or long-term borrowing financing. Much depends upon the magnitude of the expansion; retained earnings indications of inherent growth may obviate formal external plans. This is a matter for analysis and executive decision based upon the capitalgraph and profitgraph projections. Forecasting with the capitalgraph does point out, however, the magnitude of the need and the amount by which the *float* provision must be increased to compensate for the capacity expansion.

Forecast of plant expenditures is not complete unless there is a schedule which states the projects, the money required, the probable dates of cash outlay, whether the source of funds is from depreciation accruals or elsewhere, and when the asset is going to be put to work.

Nor should the effect upon the breakeven point and upon the profit-task objectives be overlooked. Not only may the capital investment program entail borrowing or other financing to make up the operating capital deficiencies, there may also be extraordinary expense to adjust present facilities to efficient coordination with the new.

Where there is any stringency of operating capital, the wise management will carry its forecasts ahead two or three years if there is a major investment program. Experience has shown that the capital stringency may not develop in the immediate forecast year, but two or three years beyond. The basic reason lies in the reasons for the capital expenditure; no management expands capacity for the sake of the equipment manufacturer's pretty blue eyes. Capacity is planned to be used, and the use of the capacity in turn breeds its own operating capital requirements.

Looking Ahead Taxwise. Emphasis has been placed upon the qualitative analysis of capitalgraph comparisons with actual capital position as well as the importance of spacing out the incidence of capital requirements in a growth period. An excellent illustration of the importance of timing and liquidity can be found in the proposal that income-tax payments be further accelerated.

The contrast in effect upon capital position can be compared to a shift from paying corporate income tax in the first half of the *following year* to a schedule that requires half of the tax to be paid in the last quarters of the *current year.* Using the Wisconsin Manufacturing Corporation forecast discussed earlier in the chapter, the contrast is given in Table XXVI.

TABLE XXVI. EFFECT OF TAX-PAYMENT ACCELERATION ON OPERATING CAPITAL

WISCONSIN MANUFACTURING CORPORATION

At period close	Annual rate of sales	Operating capital position per forecast detail		Cumulative timing of tax payments		Revised capital position	
		Short	Long	1955	Accelerated	Short	Long
Prior year..........	$3 000 000	$ 26 600*	....	0	$ 50 500	$ 77 100	
Forecast year:							
First half..........	3 000 000	124 400	....	$101 000	101 000	124 400	
Third quarter......	4 000 000	178 770	....	0	25 200	203 970	
Fourth quarter.....	6 000 000	190 508	....	0	50 400	240 908	
Second year:							
First half..........	6 000 000	....	$36 000	214 050	214 050	36 000	

Basis: 50% tax rate; profitability $22.65/$100 of sales above breakeven point.

* After qualitative analysis and $50 000 raw-material inventory reduction.

The effect of accelerating tax-payment dates is simply this: the lack of operating capital in a growing company will be more severe because the time in which the tax accrual can be relied upon as a temporary source of operating capital is considerably shorter. The stress will be particularly great when the acceleration coincides with a capital expansion program.

Conclusion. Too long has there been concern solely with the profits that can accrue with increased volume. Increased volume demands operating capital to support it, and capital projections are an essential of the planning to realize that profit. The illustrations used emphasize these points:

1. Capital forecasts can be the basis for tying in inventory control and collections of receivables with definite objectives to lighten the task of providing the capital with which the profit objectives may be realized. This is so because capital forecasting is both qualitative and quantitative.

2. Spacing out for timing is an essential part of the capital forecasting process. Duration of capital requirement is a governing influence on cost of capital procurement and probable success in capital procurement, and a determinant of the probable source of capital.

3. Development of the capital forecast tends to indicate areas for internal control action since any threat to the maintenance of the profit rate is also a threat to the success of the fiscal management expressed in the capital forecast.

CHAPTER 14

USE OF BREAKEVEN POINTS IN CONTROL OF OVERHEAD

Introduction. Overhead, sometimes referred to as indirect manufacturing expense, or factory burden, is that portion of manufacturing costs which cannot readily be seen in the product. There has been great emphasis elsewhere in this book on the importance of overhead because of the lack of intimacy in controlling any item of unseen cost.

If the unseen items of cost, i.e., manufacturing overhead, are to be controlled, objectives must be presented in terms which are recognized by the individual who spends the money. In this chapter, we consider the mission of controlling the impact of time standby on cost, with particular emphasis on overhead control as it affects the breakeven point. The complications of the two considerations, namely, breakeven at the profit and loss level and expenditure patterns at the department level, require sound and clear reconciliation if the effects of operating performance are to be reflected in breakeven thinking or vice versa.

Controlling Segments of the Breakeven Point. It was clearly demonstrated and emphasized in Chapter 4 that no breakeven is possible unless both standby and variable elements exist in the cost structure. It is evident throughout this presentation that as soon as a cost includes an element not seen in the product, a standby component tends to appear which is great or small according to the ability of operating management to control the cost in direct ratio with output and sales values.

In overhead control, this standby element must be isolated and reported against the department in question if breakeven control is to be effective.

In the Wisconsin Manufacturing Corporation, the breakeven volume of $2 112 000 net sales arises from the components of its cost pattern, that is, a standby cost of \$478 500 a year plus \$77.35 per \$100 net sales (see Table XI). Of course, this is a composite of the cost of many departments: manufacturing, selling, administrative, research, and others. Since it was built up in detail, the standby and variable segments can be traced back to the sources: the departments, and the accounts within departments.

To illustrate, the assembly department of the Wisconsin Manufacturing Corporation is shown (Table XXIX) as sharing in the total company costs to the extent of \$750 a month plus a variable of 50.2 cents per dollar of its direct labor.[1] This departmental cost is a definite portion of the whole and one of the many segments making up the composite breakeven point of the entire company. If performance realization can be measured in these many components it can then be reflected in the over-all going breakeven-point calculations.

Why Costs Must Be Controlled at the Department-charged Level. One fundamental fact must be clear in the minds of a cost-minded management if cost reduction is to produce results. While decisions are made at the top level, the effectiveness of meeting the objectives of the decisions as measured in value are at the third and fourth level of supervision. The individuals in the organization structure who spend most of the money cannot visualize their accomplishments weeks later on a profit and loss statement. They must visualize them in the elements which they see and control at the time the money is spent. To be effective, therefore, any control must be at the department doing level.

To accomplish this objective it is fundamental that the accounting and cost structure of the enterprise be able to rotate normally from the cost center to the profit and loss statement or from the profit and loss statement to the cost center. These cost centers are few or many, depending upon the organization structure and the type of company involved. There should be a cost center to represent those people who, by making decisions, spend money and make basic mistakes in the execution of policies. It is hard here to define the number. Some companies have too many, some have too few. The question of number depends upon how much segregation is needed for adequate control and whether the control is worth the added effort.

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[1] The individual department variables are stated as rates on their own direct labor and the over-all breakeven variable is expressed in terms of net sales. The reconciliation between them is obtained in the normal process of converting variable factors from "department doing" basis to final product-line income basis.

It is obvious that tracing variations from department charged to profit and loss statements or reversing this procedure is most effective when standby and variable elements supporting the breakeven are used. Tables XXVII and XXVIII are an attempt to present this problem in its elementary form before it is complicated by present and unwieldy accounting and cost techniques.

How Should Overhead Costs Be Controlled? With the advent of flow accounting and other organized attempts to keep the statistical accounting and cost departments running on a day-to-day basis, the problem of orderly daily and weekly control, including costs recording, is materially changed.

In our fast-moving economy, in which turnover of value is so important, both daily and weekly controls are essential for close haul on costs. The methods of flow accounting are too detailed for discussion here. It is important, however, to remember that all the information needed to support this department-level control should be on the daily and weekly basis. In many plants productive vs. nonproductive labor-hours relationships are controlled daily, and this information is summarized in relation to material changes in the various cost centers on a weekly basis. The weekly reports compare actual expenditures with the variable budget factors. We cannot too strongly emphasize the importance of this procedure. When the accounting department states that it creates materially more work, it will invariably show in tests that, correctly timed, there is no substantial difference in cost. Even if more frequent measures do cost slightly more, the savings will far exceed the additional cost of the process, because the facts can best be used by the operating people while they still have a clear picture of the acts which created the distorted values. Top management should insist on daily and weekly localized control, analyze the problem thoroughly, and compel all dissenters not only to state their objections but to evaluate clearly the alleged added costs created by up-to-the-minute control data. Case after case of application has demonstrated that the objections and their costs cannot be sustained after close analytical scrutiny. On the other hand, the savings can be astronomical if the control information is current and in terms which can be used by the people who spend money.

Effect of Poor Performance and Over-all Breakeven Results. For the Wisconsin Manufacturing Corporation the summary of all factory department overhead cost is given in Table XXVII.

TABLE XXVII. FACTORY DEPARTMENTAL SUMMARY

600 Direct labor–incentive	$24 178.13	
601 Direct labor–Day work	329.77	Summary—Factory departments 1 through 10 Month ending 10/31/48 Date issued 11/5/48
	$24 507.90	

Department No.	Department name	Actual expense			Budget	% budget realization	
		Labor	Other	Total		Current	Last month
1	Machine shop........	$ 2 799.08	$ 2 332.11	$ 5 131.19	$ 4 870	95	102
2	Grinding..	2 172.92	1 044.78	3 217.70	3 329	103	104
3	Forging........	304.74	668.79	973.53	940	97	89
4	Foundry.............	1 071.16	948.61	2 019.77	1 667	83	92
5	Assembly............	3 089.68	1 648.33	4 738.01	4 620	98	93
	Total productive departments......	$ 9 437.58	$ 6 642.62	$16 080.20	$15 426	96	96
6	Engineering...... . .	2 579.80	4 295.25	6 875.05	6 441	94	90
7	Factory accounting....	3 117.65	213.25	3 330.90	2 659	80	82
8	Maintenance..........	2 994.86	2 982.81	5 977.67	5 145	86	83
9	General works.... .. .	6 407.32	9 305.06	15 712.38	13 319	85	87
10	Rental........	495.17	5 675.37	6 170.54	6 402	104	99
	Total nonproductive.	$15 594.80	$22 471.74	$38 066.54	$33 966	89	89
	Total factory	$25 032.38	$29 114.36	$54 146.74	$49 392	91	90

From this table information pertaining to effect on the breakeven point may be developed. First, the budget realization[2] for the month was 91 per cent. Second, in the month shown the factory overhead differs from that allowed by the breakeven factors and from the actual overhead cost by $4 755 (54 146.74 – $49 392 = $4 754.74).

From a top-management point of view the interest is in the question, What effect does this variation in costs have on the breakeven points? The effect of this overexpenditure on the breakeven point can be calculated. Since the planned pickup in profits is $22.65 per $100 of net sales for every sales dollar sold above the breakeven point (see Table XI), Wisconsin Manufacturing Corporation expects a profit of $22.65 on *all* sales above the breakeven sales volume. But costs exceeded planned breakeven allowance by $4 755 for the period in question. Some $21 000 *more* monthly sales than the formula establishes as being acceptable (determined by the following arithmetic: $4 755 ÷ $22.65 = $21 000 added monthly sales) are needed to break even. On a yearly basis, the annual breakeven point of the Wisconsin Manufacturing Corporation would be raised from $2 112 000 to $2 364 000 net sales as a result of the 91 per cent realization reflected in the departmental control sheet.

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[2] "Realization" means the percentage the total standby and variable allowances bear to actual cost.

Performance Breakeven Arithmetic. In like manner, costs of all the divisions or segments of the company may be more or less than their own portions of the standby and variable allowances for any given period of time. The collective composite of these performance variations can and should be measured in their effect on the breakeven point. These individual variations are recorded in summary form on the profit and loss statement not only to express the variations in breakeven points as illustrated above, but to reconcile net profit for any given period of time. For example, the effect of the failure of the factory to meet breakeven costs by $4 755 is shown in the profit and loss statement in Table XXVIII.

This schedule shows a $106.00 favorable variation. This would appear minor on the surface, and as far as the breakeven point is concerned, it is minor in effect. In detail, however, the results are not so satisfactory. For example, while the over-all condition is favorable, there is an overhead loss due to performance of $4 755.00. An analysis of this loss, which is detailed by departments in Table XXVII, begins to give a clue that internally the breakeven point is disintegrating.

The most significant point in this whole presentation centers around the fact that the profit and loss statement is supported by satellite statements which *tie in,* rather than by numerous subsidiary reports which often confuse, because while they are a part of a whole, they cannot be readily reconciled directly to the final profit and loss presentation.

TABLE XXVIII. PROFIT AND LOSS STATEMENT

WISCONSIN MANUFACTURING CORPORATION *

		Any Month *Any Year*
Sales:		
Product A	$90 606.00	
Product B	92 258.00	
Product C	42 750.00	
Total net sales		$225 614.00
Cost of sales (at standard):		
Labor at standard	$ 24 507.90	
Material at standard	104 434.94	
Burden at standard	51 781.90	
Total standard cost of sales		180 724.74
Total cost of variations, favorable (see page 172 for details)		106.00
Total cost of sales		180 618.74
Gross profit		44 995.26
Other expenses (at standard):		
Selling expense	$25 223.86	
Administrative	7 978.10	
Total other expense		33 201.96
Net profit before taxes		11 793.30

* See also Table XXXIV for details which would be shown on the profit and loss statement.

Neutralizing Volume Distortion in Measuring Overhead Efficiency. It is extremely hard to determine whether there has been a good or poor job of overhead performance when department output rates have fluctuated over a wide spread between periods. This impact of volume may, in a single department, cause the average unit cost to vary from $201 a unit when 10 units were produced to $1.20 a unit when 10 000 units were produced. The assembly department required a standby of $750 a month plus a variable cost of $50.20 per $100 direct labor; with this standby and variable information available it is possible to segregate departmentally the effect of increases or decreases in volume upon the overhead rate. This is shown in Table XXIX.

TABLE XXIX. ASSEMBLY DEPARTMENT OVERHEAD RATIOS AT VARIOUS VOLUMES OF PRODUCTION

WISCONSIN MANUFACTURING CORPORATION

Direct labor per month	Standby per month	Variable $50.20/$100 direct labor	Total expense	Expense ratio, %
$1 000	$750	$ 502	$1 252	125
2 000	750	1 004	1 754	88
3 000	750	1 506	2 256	75
4 000	750	2 008	2 758	69
5 000	750	2 510	3 260	65

The above scheduled 65 per cent burden rate at $5 000 direct labor is no greater a degree of breakeven efficiency than 125 per cent is at a $1 000 direct labor load per month. Should the department operate at $5 000 worth of direct labor and with an actual overhead rate of 80 per cent, the breakeven point will be adversely affected. On the other hand, should this department have actual burden at the rate of 120 per cent at $1 000 direct labor, it is contributing to an improved breakeven efficiency because 120 per cent is five points better than the breakeven factors assumed for this level of output.

Conclusion. "Which comes first, the chicken or the egg?" epitomizes certain kinds of problems. That is the case here. From the point of view of top management, distortions from breakeven plans may indicate good or bad cost performance and, therefore, poor department performance, which is a departmental control problem. Where to start to correct a disintegrating breakeven-point situation is often debatable and depends on the point of view. Top management starts with the composite summary of breakeven points which weighs the hundreds of good and bad individual results. The department head must start with his own department and take the necessary steps to obtain a 100 per cent realization for future periods of time.

The problem of controlling costs is one of measuring from the breakeven standards which have been approved as acceptable for orderly profit-path control and segregating good and bad results. There are no short cuts to satisfactory profits. Keeping breakeven points at safe levels and using breakeven philosophy in the control of overhead is nothing more than doing something about measured variations without letting volume distort ratios and confuse the findings. Application of breakeven thinking to overhead control is just a little more discerning in fighting an old and constant problem of management: poor profits due to high costs.

CHAPTER 15

USE OF BREAKEVEN POINTS IN MEASURING PROFIT EFFICIENCY

Introduction. In the first section of this book it was stated in Chapter 6 that there were three basic reasons for variations from the profit path. Volume of output, the fourth influence on profit magnitude, does not of itself affect the breakeven point or the profit path. To evaluate profit results, however, the list must be complete:

1. Volume of output
2. Mix-of-product variation
3. Cost performance variation at any given volume
4. Selling-price variation

Each of these influences can be interpreted and measured in terms of its effect upon change in breakeven point over a period of time. Consequently the breakeven point is important in measuring and defining profit efficiency.

In Chapter 12 we emphasized the failure to meet overhead objectives and its effects on breakeven performance. These conditions are shown in the analysis of profits in Table XXXIV. While this presentation does not carry the effect of variations in costs other than overhead into the breakeven point, comparing variations resulting from all four influences listed above is needed to measure management's effectiveness in controlling the profit path.

What Is the Profit Path? First, what is the profit path? As shown in Illustration C, it is the wedge to the right above the breakeven point (A), bounded on the bottom (B) by the cost line, on the top (C) by the selling-price line; and on the right (D) by the capacity which might be produced. At the extreme

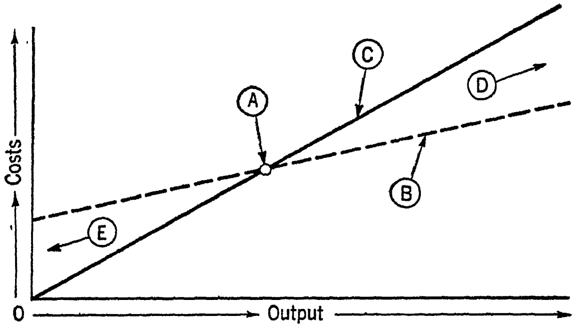

Illustration C. The profit path.

left is (E), the standby constant which creates the diverging slopes of cost and selling-price lines.

Effect of Changed Performance on Profits. The next chapter discusses the effects of selling-price changes on profits. The effect upon breakeven points and profit potentials of variations in values received for the products sold or efficiencies in producing the units for sale, singly or in combination, is measurable as a composite effective change in the performance efficiency. Table XXX records the effects on profits and on the breakeven points in the Wisconsin Manufacturing Corporation at both 90 per cent and 105 per cent of planned efficiency in the breakeven performance.

TABLE XXX. RESULTS AT VARIOUS REALIZATION PERCENTAGES

	At 105% performance realization	At 90% performance realization
Standby per year	$ 455 000	$ 531 500
Variable per $100 net sales	73.65	85.95
Profit pickup above breakeven	26.35	14.05
Breakeven point	1 725 000	3 780 000

From this schedule it is apparent that the difference between 90 and 105 per cent standby and variable breakeven performance in the Wisconsin Manufacturing Corporation results in the breakeven points changing from $1 725 000 sales per year to $3 780 000 a year. The profit pickup above the breakeven drops from $26.35 per $100 of sales at 105 per cent realization to $14.05 at 90 per cent realization. In chart form, note the major change in the size and structure of the profit-path wedge for each of these relatively close realizations (Charts 28 and 29).

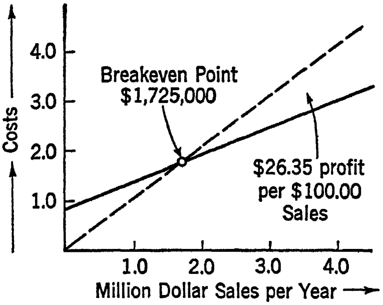

Chart 28. Profit wedge at 105 per cent performance.

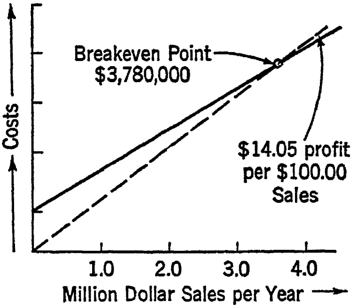

Chart 29. Profit wedge at 90 per cent performance.

Breakeven Profit Analysis. These encroachments on profit performance are often made up of many small conditions compounded over long periods of time. Individually they may seem harmless and unimportant, but collectively they gather speed and mass and create devastating changes in profits in comparatively few months. Having once established a breakeven point made up of standby and variable factors, a management can from time to time, by overplotting on the breakeven chart, compare the nature and effect of variations upon the elements which make up the breakeven chart: (1) standby, (2) variable costs, (3) percentage of the breakeven point to sales, and (4) the profit pickup above the breakeven point. This comparison is shown in Table XXXI for the Wisconsin Manufacturing Corporation, based on the 90 and 105 per cent realization referred to previously.

What Is Profit Efficiency? Under static accounting methods, profit efficiency has been snarled up by mixing together volume and performance. Too often we stated that "a 10 per cent profit is good (or bad) and a 15 per cent profit would be an outstanding job." It is stated again that this concept of a fixed-ratio standard is a management fallacy. With the breakeven data of

TABLE XXXI. EFFECT OF COST REALIZATION ON BREAKEVEN POINT AND PROFIT PICKUP

Realization, %	Standby % to net sales *	Variable costs per $100 net sales	% breakeven to sales *	Profit pickup per $100 net sales
90	13.3	$85.95	95	$14.05
100	11.9	77.35	53	22.65
105	10.4	73.65	43	26.35

* Ratio taken at normal sales of $4 000 000 per year.

the Wisconsin Manufacturing Corporation the correct objectives at various sales volumes can be illustrated.

It is a known fact that the average company cannot break even below 50 per cent sales capacity (see Chapter 11). This means that losses will usually accrue below the 50 per cent capacity point, and profit above this point of capacity. The rate of profit and the efficiency of that profit can be determined by the breakeven point. In Table XXXII the 7.2 per cent loss at $1 600 000

TABLE XXXII

Annual net sales (000 omitted)	Profit before taxes * (000 omitted)	% profit before taxes to net sales
$1 600	$115 (loss)	7.2 (loss)
2 000	26 (loss)	1.3 (loss)
2 400	67	2.8
2 800	158	5.4
3 200	247	7.7
3 600	339	9.4
4 000	427	10.7
4 400	518	11.8
4 800	608	12.7
5 200	699	13.4

* Based on standby $479 500 per year plus a variable cost of $77.65 per $100 net sales.

sales per year is, in terms of operating efficiency, just as good as 13.4 per cent at $5 200 000 sales per year.

Recording Variations from Profitgraph Formula. In a company with which the author is associated, reports to directors include reconciliation of the profit and loss to planned breakeven efficiency. A typical report for one period is shown in Table XXXIII. These results are also compared with standard breakeven for the directors in simple charts which look like Charts 30 and 31.

TABLE XXXIII. CONSOLIDATED PROFIT OR LOSS VARIATION, XYZ CORPORATIONS

	Year to date, end last period	Prior periods	For last period
Profitgraph profit @ this volume	$204 990	$157 940	$47 050
Profit due to mix of product	6 888	3 854	3 034
Budgeted profit @ this volume @ actual mix	$211 878	$161 794	$50 084
Profit or loss due to budget performance—per exhibit: 96% realization loss *	59 853	53 616	6 237
Actual net profit before taxes, per profit and loss statement	$152 025	$108 178	$43 747

* Budget-performance variation is detailed by accounts and departments, factory, selling, and administrative separately. The detailed exhibit was also used for control sheets and is similar to Table XXXIV.

One does not realize how futile a net variation similar to the $106.00 shown in Table XXVIII can become in the problem of detailed cost control. Unless this composite variation is itemized to supervisory responsibility rather than accounting nomenclature, there is still no real touch of positive cost control available. The full detail of this $106.00 favorable variation is shown below.

The above is a clean-cut summarization. For example, the $4 755.00 overhead variation due to performance is further supported without any reconciliation by the difference between the

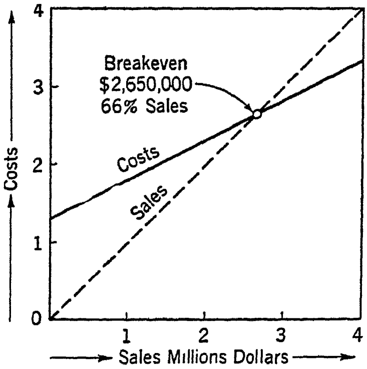

Chart 30. **Breakeven-point changes due to realization, markup, and mix, 100 per cent budget.**

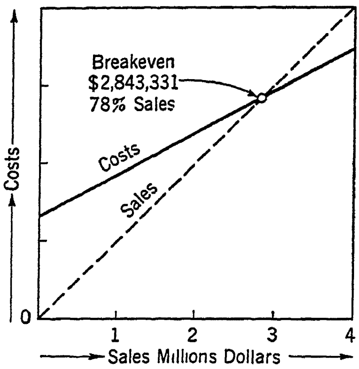

Chart 31. **Breakeven-point changes due to realization, markup, and mix, 96 per cent budget.**

TABLE XXXIV. ANALYSIS OF PROFITS

WISCONSIN MANUFACTURING CORPORATION *

		Any Month Any Year
Actual profits (see Table XVIII)		$11 793
Profit required from profitgraph		11 687
Net variation in profits from profitgraph, favorable (see page 164)		106
Details of profit variations above:		
Due to product mix:		
Costs at projected product mix (45% product A; 25% product B; 30% product C)	$214 387	
Costs at actual product mix (40.2% product A; 40.9% product B; 18.9% product C)	207 873	
Favorable variation due to mix of product	6 514	
Due to performance:		
Material price variations, unfavorable	$1 075	
Labor variations, unfavorable	118	
Overhead variation, unfavorable	4 755	
Selling expense, unfavorable	135	
Administrative expense, unfavorable	460	
Unfavorable variation due to performance	$6 543	
Due to volume:		
Overhead normal rate, favorable	135	
Net variation favorable from comparison of profitgraph and actual results as expressed by profit and loss statement		106

* See Table XVIII for details.

actual expense of $54 147.00 and the variable budget allowance of $49 392.00 shown on the departmental overhead sheet, Table XXVII.

Profit control is not a fantasy. It is a positive, realistic, painstaking, and energy-consuming performance. While the profit and loss statement is the final glorious act of recording compositely all the figures which express the results, the real knack and secret of good profit efficiency requires a building up of subsidiary reports similar to the one shown above which in turn are chained together to comparable detailed reports which have previously been referred to as shown on pages 162 and 164. The chain of good profit management requires reports which, as they detail some previously totaled figures, produce this detail in a simple logical explosion of facts. The process could be likened to walking down steps. Each step is important, but all are collectively a part of the whole.

Conclusion. To measure profit efficiency with any degree of reliability, the reasons for profit and the variations caused by mix must be segregated in costs. Without breakeven point analysis, clear-cut reasons for efficiency of profits cannot be stated. The more widely the volume of output fluctuates between periods of measure, the more involved the profit-analysis work becomes, unless variations are detailed.

Breakeven factors which support over-all breakeven points are the best media known today to determine not only the reasons for profit variations, but to express at any level of sale or output the efficiency of profits as measured from an acceptable breakeven formula.

CHAPTER 16

USE OF BREAKEVEN POINTS TO DETERMINE SELLING PRICES

Introduction. The effect of changing selling price and cost performance on the breakeven point can be determined if standby and variable cost factors are in use. In previous discussions and in the section on the "Laws of Profits" (pages 42 to 54) the various reasons for changes in the breakeven point and the profit path have been discussed.

Problems in Setting Selling Prices. Though costs may not be the direct determinant of selling price, over long periods of time there must be some spread over cost if production is to continue. Your costs or some other competitor's costs eventually set the basic selling price of a product. Since your product and price are in competition with all other needs of the buyer, the problem of cost–selling-price relationship is extremely important in profit management.

Study of selling-price and cost relationships as measured by their joint effect on breakeven points and profits above the breakeven point is a never-ending process of good management, and each audit of breakeven changes will usually present new ideas to pay for the efforts put forth.

It was previously shown that under static cost methods and fixed ratios, the comparative problem is greatly hampered by

1. The effects of volume on specific costs
2. The confusion of unseen costs (allocated and functional costs) in the problem of determining this relationship

Now that thinking in cost control has advanced to the point at which one accepts the principles of *time* costing, supported by standby and variable components which tie in with breakeven points as a means to overcome deficiencies, there comes a better understanding of and an easier method to express and measure the impact of changing selling price or costs on breakevens or vice versa.

The Effect of Selling-price Changes. Measuring from 100 per cent budget realization and normal mixes, one can understand the problems of both the sales and manufacturing departments should there be changes in selling prices as well as changes in performance on the breakeven-point factors. In Table XXXV, only the center column reading down is free of the effect of selling-price changes. In order, however, that the reader may see the impact of cost efficiencies as well as the effects of selling-price changes, the combination of both is given.

TABLE XXXV. EFFECT OF CHANGING SELLING PRICES AND COST PERFORMANCE ON PROFITS

	Selling prices		
	Increased 10% ($1.10 sales where now $1.00)	At projected level (present $ sales)	Reduced 10% ($0.90 sales where now $1.00)
At 100% cost realization:			
Standby per year	$ 478 500	$ 478 500	$ 478 500
Variable per $100 net sales	70.32	77.35	85.94
Profit pickup above breakeven	29.68	22.65 *	14.06
Breakeven point	1 610 000	2 112 000	3 400 000
At 90% cost realization:			
Standby per year	531 500	531 500	531 500
Variable per $100 net sales	78.05	85.94	90.45
Profit pickup above breakeven	21.05	14.06	9.55
Breakeven point	2 420 000	3 780 000	5 570 000

* This is the normal pickup as shown on the breakeven point at normal selling prices and at 100% breakeven performance, also based on normal product mix: Product A, 45%; B, 25%; C, 30%.

What Decreased Selling Prices Do to the Breakeven Point. How much business is needed to offset a 10 per cent reduction in selling price? What will the breakeven be after this reduction? How much will the pickup be above the breakeven point? Can all these questions be answered?

Using again the model company for an illustration, note the wide swings in the breakeven point resulting from selling-price changes up and down from the standard on which the breakeven is set (Table XXXVI).

TABLE XXXVI. EFFECT OF SELLING-PRICE CHANGES ON BREAKEVEN POINT *

	Selling prices					
	Increased 10%	Increased 5%	At current level	Decreased 5%	Decreased 10%	(1)
(A)	(B)	(C)	(D)	(E)	(F)	
Annual standby...	$478 500	$478 500	$478 500	$478 500	$478 500	(2)
Variable per $100 sales....	70.32	73.65	77.35	81.42	85.94	(3)
Profit pickup...	29.68	26.35	22.65	18.58	14.06	(4)
Breakeven point in $ (000 omitted).	1 610	1 815	2 112	2 570	3 400	(5)
	Profits or losses from above					
At annual sales of (000 omitted):						
$2 400..................	$235 000	$154 000	$ 66 000	$32 000 (loss)	$141 000 (loss)	(6)
2 700..................	324 000	233 000	134 000	24 000	98 000 (loss)	(7)
3 000..................	414 000	312 000	202 000	80 000	56 000 (loss)	(8)

* Based on 100% breakeven performance.

While the costs per unit do not actually change, the variable per $1 sales does. Note column D, line 3, which shows that at normal or present selling price, the variable is $77.35 per $100 net sales. With a 10 per cent reduction of selling price, the variable becomes $85.94 per $100 net sales. This happens as follows.

The effect of poor performance on the above breakeven points is given at 90 per cent realization of the breakeven cost factors. The $3 400 000 breakeven (F-5) becomes $5 570 000 net sales per year. Conversely, at 105 per cent breakeven realization this breakeven point, even with a 10 per cent decrease in selling price, would be slightly under the normal of $2 112 000.

Note the fact that to maintain the planned breakeven of

$2 112 000 (D-5) in this company requires a 5 per cent improvement in all costs, standby and variables. A composite schedule reflecting both increases and decreases in selling prices and cost increases and decreases can be made to fit each case.

This results in the breakeven moving from $2 112 000 (D-5) to $3 400 000 (F-5). The pickup above the breakeven point falls from $22.65 (D-4) to $14.06 (F-4). With these two factors (increased breakeven point and reduced pickup), one can determine the new sales values necessary to produce the same profit produced at any given volume of sales at present prices. On $2 700 000 net sales (A-7) one will note that the present selling prices produce $134 000 profit before taxes (D-7). At the same net sales but with a 10 per cent reduction in selling prices, the profit turns into a $98 000 loss (F-7). This difference is a profit change of $232 000 ($134 000 + $98 000). Since the new pickup at the lower selling price is $14.06 per $100 of net sales (F-4), it will require $1 655 000 more sales to return the profits to the present $134 000 before taxes for the year.

Profit differential	$232 000
Pickup on sales	$14.06

Sales needed at $14.06 per $100 to recover $232 000 equal $953 000, or an increase of 61 per cent. This can be checked further as follows:

New breakeven point per year = $3 400 000 net sales (F-5)
Pickup $14.06 (F-4) . . . . Old profit $134 000 (D-7)
Sales at $14.06 needed to produce $134 000 = $953 000

$$\frac{\$134\,000 \times \$100}{\$14.06}$$

Adding $953 000 to the breakeven point of $3 400 000 gives $4 353 000 net sales required for the company to be as well off as it was at the original selling prices.

The mechanical process of presentation in all increases or decreases is similar to the illustration used here and can usually be made at the conference table while the matter of price changes is being discussed. One needs the standby and variable factors by lines of products only when selling-price changes are being discussed for each line. Naturally, this additional information helps in formulating sound decisions now so often made on guesses or hunches, because:

1. The arithmetical use of dynamic factors in applying various possibilities reconciles two or more conditions simply and clearly.
2. The use of positive values (standby and variable factors) which tie into the breakeven point provides the means for evaluating the various possibilities.

These conditions make for an honest "laying the cards on the table" discussion and thus promote better understanding of the problems of sales, manufacturing, engineering, accounting, and other key management playing a part in the decisions. Remember, every business problem is composed of many possibilities. There is seldom one answer. The trick in using figures is to show the possibilities, leaving the decision men a chance to try varied combinations while the problem is fresh and vivid.

More Volume Does It! Does It? One of management's easiest "outs" has been the broad concept that more volume will answer all profit problems. More volume actually answers very few questions. In fact, more volume often creates still more problems of higher standby, higher working capital requirement, more costly production planning, detailed sales direction, greater advertising, etc. By application of the law of diminishing returns, overworked capacity, general inefficiencies, and more costly labor caused by second- and third-shift operations too often create unusual costs when "out-of-pocket sales" are integrated into normal operations. The belief that this additional volume is just a little more of the same and does not cost anything is 99.44 per cent inaccurate.

For instance, again consider the Wisconsin Manufacturing Corporation. To increase their sales, they turned to the item easiest to sell—the one which was commonly thought to be a mass-production item, "the more sold, the lower the cost." How this increased volume affects the breakeven point in this company is shown in Table XXXVII-A, in which increased sales of product C, an item with a high breakeven and low pickup, became a disproportionate part of total sales.

TABLE XXXVII-A. PROFIT PICKUP

	Profit pickup above the breakeven	Breakeven point
Product A....	$20.63	$ 791 000
Product B....	35.08	405 000
Product C....	15.33	1 130 000

Distortion of the sales in favor of Product C results in the breakeven-point changes shown in Table XXXVII-B.

TABLE XXXVII-B. PROFIT PICKUP

	Normal percentage	Revised percentage
Product A to total output......	45	45
Product B to total output......	25	10
Product C to total output......	30	45
	Normal	Revised †
Standby costs per year.........	$ 478 500	$ 478 500
Variable per $100 net sales *....	77.35	80.31
Breakeven point...............	2 112 000	2 425 000
Pickup above breakeven point...	22.65	19.69

* Due to high variable cost of product C.

† Due to product mix.

This "cure" of resort to the "volume craze" to solve all problems can further be demonstrated in dealing with the so-called "out-of-pocket" method of getting sales. By "out-of-pocket" method we refer to the belief that a substandard price is justified because only cash outlay need be considered in taking the business.

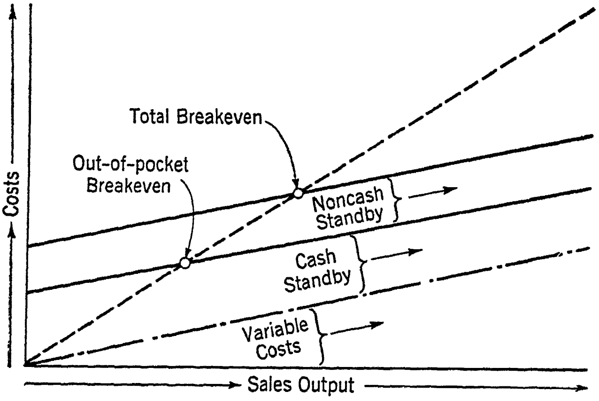

Illustration D. Out-of-pocket breakeven point.

Let us suppose that \$1 000 000 of additional business can be obtained by Wisconsin Manufacturing Corporation without increased noncash standby costs:[1]

1. Out-of-pocket basis: \$200 000 of standby made up of noncash items, leaving only \$278 500 standby per year subject to allocation to the new sales.
2. This results in reducing the price on this business by 10 per cent (approximate figure for illustration only). Actually, the reduction would be the value of the standby not assessed to this project divided by the volume expected to accrue from the action. Thus, the new variable for this volume would be \$87.16. The new breakeven point would be:

\$2 700 000 normal net sales with variable	\$77.35
\$1 000 000 out-of-pocket sales, variable	87.16
New composite variable	80.00

$$\text{New breakeven point} = \frac{\text{(standby) } \$478\,500}{\$100 - \$80}$$

$$= \$2\,393\,000, \text{ or } \$20 \text{ variable pickup}$$

While this difference looks immaterial, and while the illustration of extra volume at no absorption of standby costs makes the breakeven before and after more startling, it is not our intention to work out any specific case of application but rather to explore the possible uses of this method so that its advantages will be obvious. While each case differs in arithmetic, basically the same principle holds.

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[1] Review car case, p. 32, and Table IV-A to see full significance on profit ratios.

What Out-of-pocket Volume Basically Does. The real issue involved in extra volume is deeper than the change in the variable rate. There are two problems which often follow action of this type and which seriously affect the permanent breakeven point. They are:

1. Does a price concession on new or modified products result in weakening the regular market price for the normal output by encouraging pressure from others to get the same concession or softening the demand and disturbing adversely the regular-line price structure?
2. Does the act of increasing productivity (in this case 37 per cent on a planned $2 700 000 base sales) result in inefficiencies, more plant, more working capital, and more supervision, production control, sales organization, and advertising? In other words, will there be induced added standby costs, both out-of-pocket and noncash items? The increased standby costs not recovered by the out-of-pocket favored child are added to the costs of the regular product, which is now the "stepchild."

When Out-of-pocket Sales Increase Standby Costs. Let us take an average example of what usually happens when this "get-volume" craze must be satisfied on an out-of-pocket or marginal cost basis. The addition of $1 000 000 marginal sales to a volume of $2 700 000 net sales can do the following:

Illustration

1. Reduce selling price on normal sales 5 per cent (given).
2. Increase standby due to interest on money, equipment needed to take care of the added volume by $50 000 yearly (given).

Results

1. The original $77.35 variable on the regular line then becomes $81.40 because of the 5 per cent softening of prices in

general. Coupled with the assumed \$85.95 variable on the marginal sales the composite variable rises to \$82.70.

2. The breakeven point changes:

Old standby	\$478 500 per year
Added by expansion	50 000 per year
Total to recover	\$528 500 per year

$$\text{New breakeven point} = \frac{\$528\ 500}{\$100.00 - \$82.70} = \$3\ 060\ 000$$

$$\frac{\$3\ 060\ 000}{\$3\ 700\ 000} = 82\% \text{ of new volume required to break even}$$

While this case is not as extreme as many which exist, it should help in visualizing the mathematics of the problem. Sometimes added "out-of-pocket" volume comes from some special item which has no bearing on the regular line and thus will not affect the selling price of the regular line. It still can be dangerous because:

1. The standby must still be recovered. It cannot be buried.
2. The new work may disrupt the regular lines and add standby costs which the regular line must absorb.
3. Out-of-pocket volume is sloppy business and like other such habits may lead to abuses and excesses. The author has seen company after company start out-of-pocket items or "loss leaders" in the line, presumably to fill voids in the plant and help, in theory, absorb overhead. In almost every case this has resulted in the tail wagging the dog. All these companies went downhill, several failed, and the rest took several years to recover from sloppy thinking.
4. It tends to grow in percentage to total volume because, once started, the method is used to solve new problems of the moment, as the easy way out.

Experience has indicated that trouble results when marginal business becomes permanent or temporarily indulged in to the extent of more than 5 per cent of the total volume.

Combining Selling-price Changes and Performance. All the conclusions applied in the arithmetic in the foregoing illustrations assume that the *time* cost performance is held at 100 per cent realization of standby and variable factors. This condition does not often happen during most radical changes in output which result after "out-of-pocket" volume decisions. However, these extra complications are easy to interpret by a "baseball schedule" (see Table XXXV). The details of this schedule in segments of 1 per cent in budget performance and 1 per cent gradations in selling-price change can be made by anyone who has the standby and variable factors with which to start. Many companies which use the "baseball breakeven schedule" break it down by lines of product so that in decision management meetings the effects on breakeven by volume, sales prices, etc., can be evaluated quickly by key supervisors or divisional managers as they discuss and work with the specific problem.

If breakeven factors contribute no more in selling-price control than to break down the almost universal concept of policy-forming executives that "volume answers many questions concerning profits," they accomplish much. While "if I could only get my volume up" is very often right, it is also too often wrong. That this idea is the easy way out for most of us is a basic management fallacy, and the use of breakeven controls will make a management uncomfortable if by decision they abuse the practice.

Added Volume and Capital. By use of the capitalgraph and coordinator chart, the effects of added out-of-pocket volume can be measured in terms of effect on the available capital and the return thereon. The arithmetic of the impact of these conditions can be used in any study of changing selling prices or out-of-pocket costs. Table XXXV showed us that reducing selling prices 10 per cent increases the breakeven from $2 112 000 per year to $3 400 000 net sales per year. Above these respective volumes of sales the profit potential is reduced from a pickup of $22.65 per $100 net sales to $14.06. By arithmetic, any management can determine the added volume needed to return the same profit (see table on page 184).

It is sometimes said by the sales department that if selling prices were reduced 10 per cent, they would sell $1 500 000 more. Sounds good, but is it?

Not only does this maneuver reduce profits, it poses other important questions for a management to answer:

	Before reduction	After reduction
Sales per year	$6 000 000	$9 670 000
Breakeven sales	2 112 000	3 400 000
Profit pickup sales	$3 888 000	$6 270 000
Profit pickup per $100 sales above breakeven	22.65	14.06
Profit before taxes	881 000	881 000

Sales expected after 5% reduction of selling price	$7 000 000
Breakeven after reduction	2 570 000
Profit-pickup sales	$4 430 000
Profit pickup per $100 sales above breakeven	18.58
Profit before taxes	823 600

1. Is there enough working capital available to handle the extra sales?
2. Can the plant take care of the added volume without added standby costs?
3. Can selling really do a good job without added standby costs?
4. Will the added sales hold present and new regular customers, or merely attract "good-time Charlies"?

Conclusion. Addition of billing at any price concession is rarely the answer to most profit problems. Sales create problems. Use breakeven points to shade the possibilities of whether added sales can carry their weight and actually strengthen the profit path.

CHAPTER 17

USE OF BREAKEVEN POINTS IN COMPETITIVE COMPARISON

Introduction. Neither wars, nor strikes, nor prolonged economic adversity can erase a business or destroy profits as fast as new and better methods in the hands of an enlightened competitor. In practically every industry comparison today, there appears a wide divergence in the profit paths of the various companies in that industry. Some have never forgotten their competitors, even during lush times, but too many companies have "eaten too well too long."

Many managements are prone to discount the advantages of comparisons with other companies within their industry and with similar companies in other industries, because past experiences of comparison have so often been unsatisfactory. It is easier to be satisfied with merely picking up the certified balance sheet and profit and loss statement of competitors and drawing conclusions from them, especially if casual comparison makes one's own company "look good." This sort of surface comparison can lead to any of several conclusions, such as:

1. Your own company is "hot stuff" and the competitor had better look sharply.
2. Your own company fits the pattern fairly well, even though it is not outstanding.
3. You may have an uneasy feeling that your working capital is short, that your costs are too high, or that you are lagging in any dozen other generalities which might be suggested by this superficial comparison. But where? Sure your selling costs are higher! But why? When it comes to a close, intimate comparison, however, have you found a satisfactory way to perform this task? If not, the reason may be (*a*) lack of sufficient de-

tailed information concerning your competitors to allow intimate comparison, or (*b*) the difference in size between companies in the industry (some smaller than your company, some larger), which seems to preclude true, accurate comparison.

For example, if you were with one of the smaller automobile companies, you might say, "How can I compare our figures with those of General Motors?" As a member of a smaller steel company, you might ask, "How can I compare our figures with those of Bethlehem or of the Corporation?" If you were in the farm-implement industry, attempting to improve the ratios of performance in one of the smaller companies, it is easy to conclude, "Our setup cannot be directly compared with Deere or with Caterpillar; they are so much larger."

Comparison by Static Ratios Unsatisfactory. If the comparison must depend solely upon static ratios, there is little doubt but that these conditions do exist and will continue to exist. Direct comparison is nearly impossible and, when attempted, is unsatisfactory because of the unknowns involved, such as use of capacity. With the use of *time* costs and their application to the best available figures of competitors, however, comparisons take on new impact. No longer does the *effect of size* distort the comparison because mere size is relegated to *standby* costs which become static dollars. Relative performance is reflected in the variable costs which are directly comparable regardless of size.

As an illustration, if one's variable cost, including cost of production, selling, and other administrative costs, is $0.78 per dollar of sales, and a competitor's as a whole can operate at $0.72, then, basically, the higher costs are *not competitive.* On each unit A sells in competition with B, it spends $0.06 a unit more, resulting in a higher breakeven point unless Company A has an unusually low standby cost. Regardless of anything else, the variable pickup of $0.06 per sales dollar less means less opportunity to make profits and more vulnerability to reductions in selling price.

Cannot Get Enough Competitive Figures? One may say, "That's all well and good. I could make comparisons, too, if I had my competitors' figures." So, before we proceed to the statistical analysis of competitors' performance in relation to your own, time should be spent in a discussion of the problems involved in obtaining accurate figures of competitors.

There are several sources of information which can be tapped, but the primary one is audited financial statements issued annually. Since most annual statements are prepared according to a standard, accepted procedure, their classifications are usually directly comparable to your own and the values are built much as your own asset and liability values as shown on the balance sheet are determined. As basic statements for comparison, the annual audited profit and loss and balance-sheet statements are far from satisfactory in detail. They do give clues, at least, to whether the differences in comparative performance are "above the line" (in manufacturing) or "below the line" (in selling and administrative).

Much other subsidiary and fundamental information issued by the companies periodically can be used to broaden the standby and variable details and their determination. For example, there are the reports issued to the Securities and Exchange Commission by stock-exchange listed companies. Most of us can find enough patterns in the 1 400 companies listed on the New York exchange to make comparisons and provoke breakeven thinking. There are also reports issued to other Federal agencies, particularly in certain types of industries such as aviation (which reports to the Civil Aeronautics Board) and the railroads (which report to the Interstate Commerce Commission). Trade statistics are often issued by other groups. Much information is generally available—in fact, more than is usually suspected—if an executive will but seriously investigate and delegate someone to research for this information.

Accuracy in Estimating Competitors' Costs. Since the best information obtainable on competitors' costs is not so well detailed as information available for your own company, it can be assumed that the standby and variable factors determined from superficial data of others may not be so accurate when broken down to detail cost elements as those of your own company factors. Past experience in analyzing almost 1 000 companies on the basis of published data has indicated that error is much less than one might expect. Standby and variable factors supporting breakeven points which were established in the 1936 to 1939 period from superficial data (many times limited to the published reports of the company in question) were remarkably accurate in measuring companies' results in the years since 1939.

A review of the breakeven charts kept for almost 15 years, on approximately 1 500 companies, reveals that most of these companies still maintain the same relative time-cost relationships which determined their breakeven points immediately after the Second World War. Where there is a major difference, it can usually be accounted for by changes in corporate structure or plant size, or by other conditions determinable by a close study of the official annual reports as issued.

Several factors, however, must be adjusted in using comparative statements for the determination of time-cost factors. Since depreciation is a standby cost and has a tendency to change from year to year (and major changes have occurred since 1941), it must be placed on a consistent base to be comparative. This is usually accomplished by using the more recent depreciation amount as the basis and adjusting costs for all years to that amount. Depreciation is a standby cost, but since it has shown a marked year-by-year increase since 1941, it will distort the variable values unless all years studied are adjusted to a common depreciation allowance. This procedure was followed in the illustrations used in this chapter.

The purpose here is not to give illustrations in such detail that work on your part is unnecessary. Rather, it is to impress you with the idea that comparisons can be made with apparently superficial information. Where such comparisons of relative industry performance have been made, the added understanding has consistently made for better breakeven performance for the member who spent the time in the analysis.

Oliver Farm Equipment Company, now Oliver Corporation, experimented with this process as far back as 1939. From their study of the years 1936 through 1939, while operating at about the same level of activity, a material improvement in the breakeven point as a percentage of Oliver's capacity was evidenced. Putting management's fingers on weak spots through industry breakeven comparisons enabled Oliver to show lower breakeven points and better profits. Summary comparisons are reduced by what we call the "look-see method," which is a breakeven comparison of Oliver's performance with that of other members of the farm-implement industry.

Breakeven-point Analysis of the Farm-implement Industry. The principles used by Oliver are shown in Tables XXXVIII to XL. Within the industry are two types of companies: (1) those designated as "pure" and (2) those designated as "mixed," depending upon whether the company so classified is largely in the farm field (Oliver) or whether its business is "mixed," including many types of products (Allis-Chalmers). In the breakeven comparison representative companies of each type were used and their breakeven calculated. In fiscal 1952 Group A (composed of "pure" companies: J. I. Case, John Deere, Minneapolis-Moline, and Oliver) produced a total of $730 900 000 net sales. Group B

TABLE XXXVIII. PLANNED BREAKEVEN FACTORS FOR THE TWO GROUPS

Company	Forecast standby per year, in millions of $	Variable per $1 sales	Break-even point, in millions of $ *	Pickup per $1 net sales above breakeven
Group A. Pure:				
J. I. Case	$ 10.4 †	$0.75	$ 41.6	$0.25
John Deere	24.1	0.71	83.1	0.29
Minneapolis-Moline	5.0	0.785	23.3	0.215
Oliver Corporation	10.0	0.78	45.5	0.22
Group total	$ 49.5	$0.739	$193.5	$0.261
Group B. Mixed:				
Allis-Chalmers	$ 31.3	$0.795	$154.0	$0.205
Caterpillar	37.5	0.75	150.0	0.25
International Harvester	75.0	0.815	405.0	0.185
Group total	$143.8	$0.80	$709.0	$0.20
Both groups	$193.3	$0.783	$893.5	$0.217

* Based on scatter charts as developed.

† Depreciation included in standby by companies (year 1951). J. I. Case, 3.1; John Deere, 6.2; Minneapolis-Moline, 1.4; Oliver Corp., 2.9; group total, 13.6. Allis-Chalmers, 3.3; Caterpillar, 7.8; International Harvester, 23.9; group total, 35.0 Both groups total 48.6.

(composed of "mixed" companies: Allis-Chalmers, Caterpillar, and International Harvester) did $2 195 100 000 net sales. Together the two groups accounted for a total of $2 926 000 000 net sales for the year.

In Table XXXVIII the breakeven characteristics of the two groups, and of the companies within each group, are compared.

An application of these breakeven factors to actual results by companies in 1949 is shown in Table XXXIX.

TABLE XXXIX. FARM-IMPLEMENT-INDUSTRY BUDGET PERFORMANCE IN 1949

(Dollar values are in millions)

Company	1949 net sales	Actual costs	Forecast annual standby *	Forecast total variable	Forecast costs †	1949 budget realization
Group A. Pure:						
J. I. Case	$ 170.3	$ 140.7	$ 11.5	$ 133.0	$ 144.5	102.5%
John Deere	333.2	257.3	24.7	240.0	264.7	103.0
Minneapolis-Moline	73.6	62.9	4.7	56.5	61.2	97.3
Oliver Corporation	101.3	91.7	9.7	79.0	88.7	95.7
Total	$ 678.4	$ 552.6	$ 50.6	$ 508.5	$ 559.1	101.0%
Group B. Mixed:						
Allis-Chalmers	$ 351.1	$ 318.0	$ 33.8	$ 283.0	$ 316.8	99.7%
Caterpillar	254.9	222.7	15.7	216.0	231.7	104.0
International Harvester	908.9	827.9	81.0	740.0	821.0	99.0
Total	$1 514.9	$1 368.6	$130.5	$1 239.0	$1 369.0	100.0%
Total all	$2 193.3	$1 921.2	$181.1	$1 747.5	$1 928.6	100.3%

* Includes 1949 actual depreciation.

† At sales volume for period based on standby and variable factors which support breakeven point.

All these breakeven factors were set in 1945 from published figures. The only difference as applied to later years was an increase in standby to compensate for materially greater depreciation.

Notice how these 1945 standby and variable allowances worked when applied to the companies' recent-years actual performance. The application to years after 1949 as recorded by realization percentage of performance[1] is given in Table XXXIX-A.

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[1] Refers to relationship of breakeven-point factors to actual costs at sales volume for year.

TABLE XXXIX-A. FARM-IMPLEMENT-INDUSTRY COMPARATIVE BREAKEVEN REALIZATION, 1949–1953

Company	1949 B/E * realization	1950 B/E * realization	1951 B/E * realization	1952 B/E * realization	1953 B/E * realization
Group A. Pure:					
J. I. Case	102.5%	107.0%	95%	92.0%	87%
John Deere	103.0	106.0	98	95.5	92
Minneapolis-Moline	97.3	98.7	99	90.5	88
Oliver Corporation	95.7	99.2	95	94.5	94
Total	101.0%	104.2%	98%	93.5%	90%
Group B. Mixed:					
Allis-Chalmers	99.7%	104.1%	102.0%	98.5%	94%
Caterpillar	104.0	109.0	93.5	97.0	99
International Harvester	99.0	102.5	101.0	96.0	94
Total	100.0%	104.2%	99.0%	97.0%	96%
Total all	100.3%	104.2%	99.0%	96.0%	94%

* Refers to relationship of breakeven point to actual costs at sales volume for year in question.

How to Make a "Look-See" Comparison. It has previously been demonstrated that static accounting figures are of doubtful value in a detailed ratio comparison of companies with materially different sales volume. This is because of the inability to proportion the variations in ratios created by the size differential.

Previously it has been shown that, when standby and variable characteristics supporting a breakeven point are available for a company or series of companies, the reason for variations in ratios between companies can more clearly be expressed. Regardless of size, variable relationships are directly comparable; for example, referring to Table XXXVIII, Deere with a variable ratio of 71 cents per dollar of sales has a 7.5 cent current-cost advantage over Minneapolis-Moline which has a variable cost ratio of 78.5 cents per dollar of sales. One method of recording these comparisons is by "look-see" charting.

A "look-see" chart, therefore, is the setting on one chart ratios which record common breakeven relationships between companies, regardless of size, in order to get a relative picture of profit and breakeven efficiency.

It is, no doubt, obvious that a company with 100 million dollars in sales and one with 1 million dollars in sales cannot be recorded on the same chart directly, for the picture recorded would have a ratio of 100 to 1. Such a direct chart comparison can, however, be made if the several sales sizes are resolved to a common denominator. To carry out this requirement, the following procedure is generally used in "look-see" chart presentation:

1. Pick a recent year or series of years of net sales and call those base sales 100 per cent of output for each company.
2. For each company for the years used for base sales determine the percentage that the standby (including depreciation) is of the base sales (see Table XL, column *G*).

Table XL. "Look-See" Ratios in Farm-implement Industry

Company (*A*)	Net sales 1953, in millions of \$ (*B*)	Standby per year, in millions of \$ (*C*)	Actual * variable pickup (*D*)	Actual * 1953 B/E point, in millions of \$ (*E*)	% break-even to 1953 sales (*F*)	% standby to sales (*G*)
J. I. Case	\$ 111.5	\$11.1	\$0.125	\$ 88.8	79.7	10.0
John Deere	348.3	25.8	0.22	117.0	33.6	7.4
Minneapolis-Moline	105 7	5.5	0.10	55.0	52 2	5.2
Oliver	136.6	10.4	0.165	63.0	46 2	7.6
Allis-Chalmers	514.5	35.3	0.155	227.5	44.2	6.9
Caterpillar	433.8	42.4	0.240	177.0	40.8	9.8
International Harvester	1 256.1	75.3	0.120	627.0	49.9	6.0

* After adjustment of planned breakeven to actual results for the year.

3. Also determine the percentage that the breakeven point is of the same base sales (see Table XL, column *F*).
4. On chart paper mark off the base of the chart in this direction → from 0 to at least 100 per cent, representing the percentage of base sales selected in 1 (column *B*).
5. Near the middle of the chart paper this way ↑, draw a line this way → across the chart paper, marking it zero (0) in the left-hand margin. Using the same scale above and below zero, record on the left side below zero ↓ percentage of losses, and above zero ↑ percentage of profits.
6. Select a company, mark the per cent of standby on the loss-percentage scale at zero sales base equal to the per cent that the standby is of base sales.

7. Along the base of the chart find the percentage that the breakeven is of base sales and mark this point on the zero-profit line.

8. Draw a line through these two points from zero base sales to maximum base sales as shown on the chart. To illustrate from the figures in Table XL, the above requirements are recorded on Charts 32 to 34.

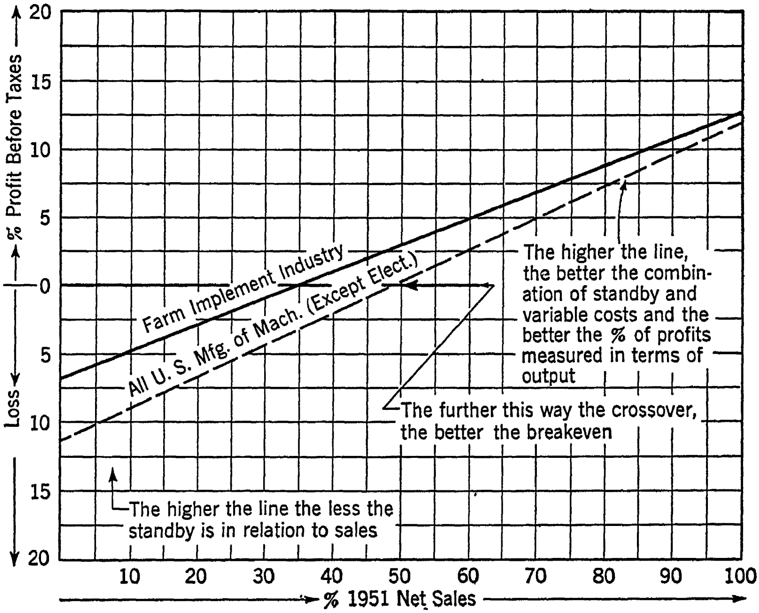

Chart 32. "Look-see" chart comparison of profit and breakeven factors.

Application of "Look-See" Principle to Farm-implement Industry. Based on the several companies in the farm-implement industry which are analyzed in this chapter and by use of the current breakeven point which is after adjustment of the breakeven realization, look-see comparisons are shown for the companies in the industry.

No attempt is made here to analyze the individual charts specifically, since the charts themselves are self-explanatory.

In Chart 33 the clean-cut but widespread variation between the breakeven points of Deere and Case is a positive representa-

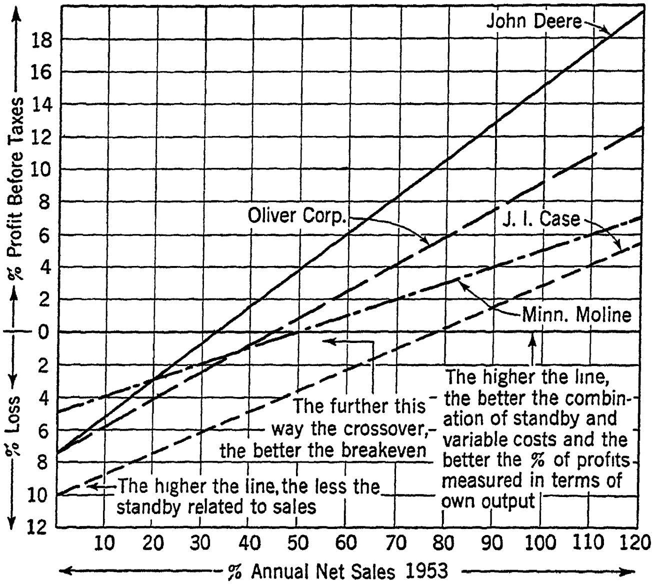

Chart 33. "Look-see" chart comparison of profit and breakeven factors in farm-implement companies (pure group). Based upon actual 1953 performance.

tion of how these charts can be used to make direct competitive comparisons for any given period.

While the variation in breakeven points is minor in the comparisons of the companies shown in Chart 34, nevertheless, the chart shows the favorable position that one company has in relation to others making similar products.

This comparison is influenced as each of the companies involved has major sales lines other than farm-implement equipment, and in each company these "other products" are entirely different. The chart does, however, have a significant comparison in that it gives a clue to the ability of "other lines" to carry the farm-implement segment in case conditions in the farm-implement industry become unsatisfactory.

Comparison of Case, Caterpillar, and Deere. Chart 35 shows a look-see comparison of Case, Caterpillar, and Deere. Notice the wide variation between the effective profit performance of the three companies. Notice that the "look-see" charts invariably record the highly individual companies' ability to manage the

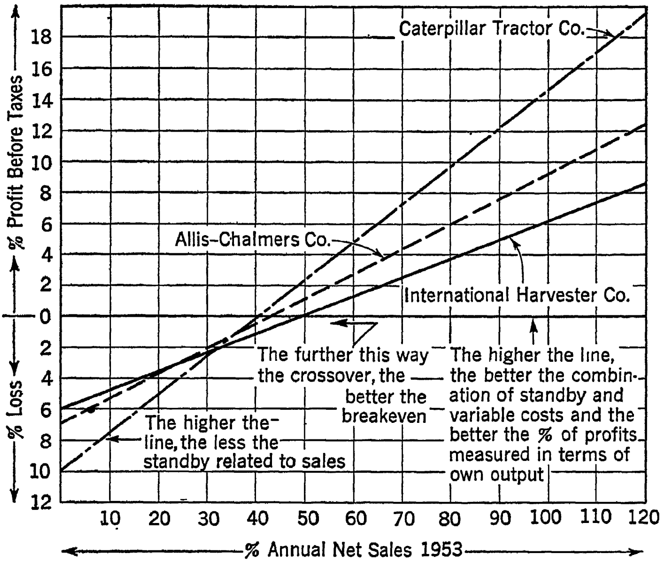

Chart 34. "Look-see" chart comparison of profit and breakeven factors in farm-implement companies (mixed group). Based upon actual 1953 performance.

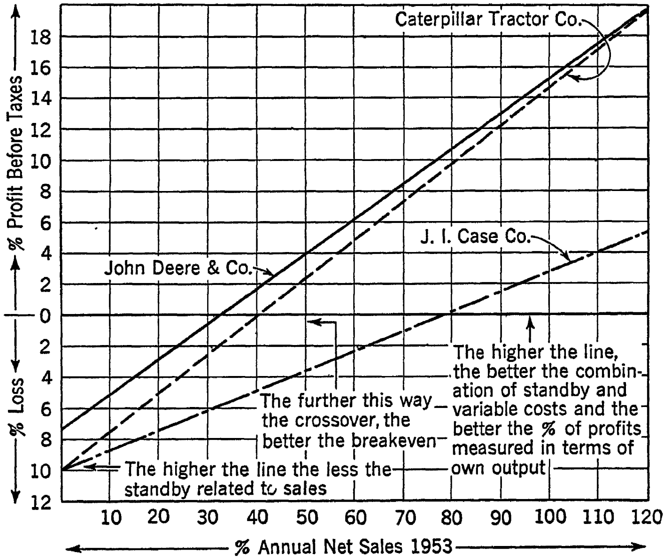

Chart 35. "Look-see" chart comparison of profit and breakeven factors (J. I. Case, Caterpillar Tractor, John Deere). Based upon actual 1953 performance.

customer's demand for quality and quantity. Just as a matter of interest look what the stock market has done during the same period of time (Table XLI).

TABLE XLI. STOCK PRICES OF FARM-IMPLEMENT COMMON STOCKS

Company	Jan. 1, 1949	Value of stock over 1949			
		Dec. 31, 1952		May 15, 1953	
		Price	% increase	Price	% increase
J. I. Case.....	17	24	40	19	12
Caterpillar....	27	65	140	60	122
John Deere....	16	30	87	27	69

What Falling Prices Do to Breakeven Points. Farm-equipment-industry breakeven points will rise rapidly if major decreases in selling price become necessary in the future. For example, based on 1951 standby factors of $37 500 000 annually, and a variable of $0.75 per $1 sales, Caterpillar's breakeven point in 1951 was 37.1 per cent of their 1951 net sales. With a 10 per cent reduction in their selling price, their breakeven point would automatically jump to $224 000 000, or 61 per cent of their 1951 net sales.

A schedule of the shadings of these variations as they affect Caterpillar is shown in Table XLII.

Conclusion. The depth of the breakeven-point detail in an average company is limited only by the ability of the management to comprehend the principles and apply them. These are the yardsticks which allow a dynamic business to be dynamically measured, not only to achieve past, present, and future comparisons with itself, but to allow comparison with other active companies and competitors. For with breakeven concepts, volume no longer clutters up the ratio comparison. It is this easy: if your company's variable costs are 80 cents and others in the industry have 70 cents variable costs, they have a 10 cents per dollar of

TABLE XLII. ANNUAL BREAKEVEN IN SALES DOLLARS AT VARIOUS SELLING PRICES AND COST EFFICIENCIES

CATERPILLAR TRACTOR COMPANY

(In millions of dollars per year)

	If costs go up		If no change in costs occurs	If costs go down	
	10%	5%		5%	10%
If selling prices go up:					
10%	$165	$139	$118	$102	$ 88
5%	194	157	132	111	95
If no change in selling prices occurs	225	186	150	124	104
If selling prices go down:					
5%	318	229	178	142	117
10%	505	320	224	170	135

sales head start in cutting selling prices in a competitive market. Why go further?

But there is much more to glean from these dynamic comparisons if one has the will to face the facts—cold facts which are hard to shake when they tie in to breakeven points.

CHAPTER 18

USE OF BREAKEVEN POINTS IN ORGANIZATION STRUCTURE

Introduction. Mention of the phrase "organization structure" summons a variety of mental images. To some, it evokes the picture of a hushed corridor lined with luxurious suites infested with a college of vice-presidents and other corporate officers, or many gold-leafed titles emblazoned on many ground-glass doors. To others, the vision may be of an interminable list of departments, each with its boss man, each solidly bulwarked in its prerogatives and responsibilities against all the others. Or "organization structure" may mean the "channels" for paper work and the hurdles individuals must leap over in their small part of operating the inexorable machine which chews up material, grinds out products, and ships the goods to distant and mysterious people known as customers. To still others, and these are probably nearer the truth, organization structure means no more than "who does what and how we work together."

All these mental images may be true to a greater or lesser degree at any given time and at differing times in the same business organization. When things "are going well," that is, the organization is meeting its problems and solving them smoothly, little thought is given to organization structure as such. When the going is rough, and someone studies the organization to find out why or believes that organization structure is the root of the fault, there is likely to be a shower of diagrams known as organization charts.

Sometimes the published organization charts merely confirm the traditional way of doing things. Again, they may be used as a graphic representation of the way someone thinks the organization should work. Whether the particular chart reflects a fact or a hope is immaterial. Bound up in the organization-chart picturization are a style and method of doing business. Whatever the style and method reflected, there is also an implicit fixing of standby costs, a determinant influence on the costs of being in business and of the breakeven point. The purpose of this chapter is to discuss the influence of organization structure on the breakeven point and to point out a few of the indications of standby that can be controlled in structuring the organization.

Organization Fundamentals. Organization fundamentals are here stated in terms of an enterprise for profit. The definition of "profit" in some types of organizations may not be money gain; where it is reduction of loss, as in fighting a flood, or developing human resources, as with an educational institution, the principles of organization must still be observed to achieve the most desirable results.

First of all, of course, is the *aim and reason* for there being an enterprise. The reason may grow out of an assumed need for a service, or from development of a desirable product, or from the possession of a specialized knowledge useful to others. While this may seem obvious, let us emphasize that this is the first step in *planning* the enterprise. Its aim determines how big the enterprise must be to get a start, how long it may be expected to endure, whether the entrepreneur can do it all himself, or how much and what kinds of help he must have. In short, must there *be* an organization?

The *second* fundamental grows out of the first. It is difficult to imagine any but a business miniature in which there is not some division of labor between the operating head and those he collects around him. As soon as there is any division of labor, there usually comes a *delegation of authority.* The authority delegated may be very narrow, or very broad. In contacts with third persons, a delegation of authority may be assumed, even though none was intended. By specific act and by default, by association and by minuscule precedent, there is usually a build-up of delegated authority. And this follows in either a large or a very small "organization."

Fixed responsibility is the seal of the delegated authority. Control is the measurement of discharge of the fixed responsibility. Fixing responsibility is necessary to positive direction and assurance that fundamental plans which were expressed as the conscious aim and objectives of the enterprise will be followed to the best of the subordinate's ability.

Regard for personal capacity is the fourth fundamental. It is the guiding influence that governs just how the second and third fundamentals are applied to individuals.

Application of Organization Fundamentals. The directing and operating head of the enterprise finds that if his plan is to operate, the enterprise must accomplish three tasks:

1. Produce the business goods or service
2. Sell the business product to those who will benefit
3. Administer and coordinate production and selling

As soon as there are a number of persons engaged in the enterprise, there is a tendency for an organization structure to take form. Division of labor is only part of the reason. The controlling reason lies in the range of personal characteristics. It is often possible to find a man who can administer and produce; it is often possible to find a man who can administer and sell; it is extremely rare to find in one individual a high level of ability in all three fields of administration, production, and selling.

Therefore, stated in terms of the usual "tree" chart, the minimum organization seems to be as shown in Illustration E.

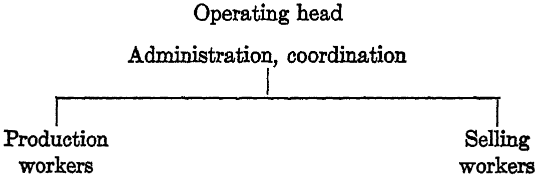

Illustration E. Organization chart.

So long as the operating and directing head holds in his own hands the function of administration and coordination, the organization holds to the military-line type. Multiplication of workers, in either production or selling, or in both, does not disturb the fundamental nature of the organization.

With increasing size, the need for specialized talents and the principle of division of labor according to best abilities open the gate to so-called staff functions. The purpose of staff functions is liberation of line executives and workers from technical planning problems so that their full energies can be devoted to primary objectives. Usually the first appearance of specialization and staff functions is in the financial affairs of the business, but production and selling also tend to develop specialization of their own. Not uncommon is the type of organization chart shown in Illustration F.

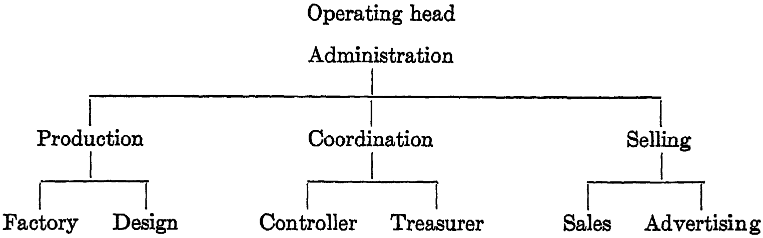

Illustration F. Organization chart.

Each of the now recognizable organization subdivisions may be further elaborated. Administrative burdens may progress to the point at which there is need for vice-presidents in charge of patents and legal affairs; there may be a secretary in addition to a controller and a treasurer. There may be vice-presidents in charge of product divisions and functional vice-presidents in charge of engineering design, manufacturing, industrial relations, and such other functions as may seem appropriate and necessary.

As these organization charts develop, with staff groups making their appearance below the vice-presidential level, there is a delegation of authority in a defined area, a fixing of responsibility for results, and selection not only upon the basis of technical ability, but also upon the ability to "get along with," and render service to, other parts of the organization.

What an Organization Chart Is—and What It Is Not. An organization chart is at best a crude representation of a mixture. Both tangible facts and assumed intangibles are reflected in its drafting. Ordinarily no attempt is made to go beyond a representation of the several areas of assigned responsibility, the downward lines of delegated authority, and the upward allegiance to constituted directive authority. In some cases, attempts are made to depict functional delegations of authority and assignment of responsibility, as in the case of the plant accountant whose line superior is the branch-works manager but who has functional delegation from and responsibility to the company controller.

However carefully drawn, no organization chart can completely depict all the working interrelationships within an organization. Neither can it state the underlying spirit of working together, the extent to which it exists, or the extent to which it is lacking. Except when there is intimate personal knowledge, reading of the chart cannot disclose whether the authorities apparently delegated have been delegated in fact, or whether apparent authority is withdrawn at the first sign of stress. And on the contrary, drafting the organization chart states only that a responsibility has been assigned, and not whether that responsibility is actually being discharged to the limits desired by the assignor.

Despite all that can be said for and against a particular organization chart, it can be a useful instrument of management. An organization chart may be:

1. A visualization of the organization structure as it exists, or
2. A visualization of an organization established or to be established by executive decision, or
3. A visualization of an organization structure which has no basis in fact or future planning because it is drawn upon erroneous assumptions.

We shall rule out of the discussion a chart which can be shown to be erroneous. If this be the case, it must be discarded and a chart redrawn which does portray a fact or a plan.

A correctly drawn organization chart is highly symptomatic of the style of business operation, of the standby costs of maintaining the organization, of the control of the breakeven point, and of the quality of management generally.

At this point, perhaps there should be inserted this bit of warning. The organization chart generally published for the guidance of the members of the organization need not follow the form used for symptomatic analysis. The symptomatic analysis should be done first, and the corrected and adopted plan of organization should then be issued in its normal form.

Standby Costs Reflect Organization. Standby costs have been defined as those which do not seem to respond to volume of activity and include depreciation and the cost of carrying the nucleus organization. It is obvious that in a case in which there is a heavy staff of officers, the nucleus organization can develop costs of no mean proportions. What may not be so obvious is that a large or small officiary is not in itself an indication of the generation of standby costs resulting from overelaboration of organization structure. There may be quite different degrees of standby development down to the lowest levels of organization status.

Control of organization standby costs is the primary objective of the symptomatic organization analysis. Correction of organization structure is a by-product. Improvement in operations will be found not so much in the elimination of superfluous structure as in stimulation of interest and revived energies of frustrated members of the organization. Here is the way to go about it:

1. Beginning with the president, and then for each of the company officers, list:

Department unit by number and name

Title, name of supervisor in charge of the department and subordinate to the officer

Department head's salary

Number and salaries of persons within the department having supervisory status

Number and average salary rate of other members of the department

Standby salary or labor cost allowed for the department in supporting the breakeven-point factors at zero activity and at 20 per cent of current operating level

This list should be complete, covering every nook and cranny of the enterprise. Check its completeness as follows:

a. Be sure every department recognized in accounting segregations is included whether or not there is a recognized "supervisor in charge." Be sure that within a department as it is recognized in accounting segregations there are not two or more effective departmentalizations. This may be the explanation of there being more than one person of supervisory status within an established department. If this be the case, your chart should recognize the situation.

b. Check all chains of command which seem in the least doubtful. Ascertain that the department does in fact report its results and hold itself responsible to its nominal directing superior. If more than one superior seems to hold sway over a department, check with all the supervisors involved and draw a conclusion. It is not unusual to find that 15 per cent of the work force will not know who is their true boss, and 15 per cent of the supervisors will not be sure of the limits of their authority and responsibility. Do not assume that executive officers' opinions are absolutely authoritative concerning the real and effective line of authority.

c. The standby labor cost for the department should have been determined in the process of building the variable operating budgets which support the breakeven-point factors. If this information is not readily available, the breakeven-point goal of the enterprise, or its apparent breakeven point, cannot be supported by facts.

2. Grade the supervisors in broad rate classifications. Appropriate ranges depend upon the particular organization. It will be found most convenient to reduce all pay rates to weekly amounts. The ranges in Illustration G are given to illustrate the points only.

A1. Officers, and weekly salary in excess of $400
B2. Weekly salary in excess of $300, less than $400
C3. Weekly salary in excess of $250, less than $300
D4. Weekly salary in excess of $200, less than $250
E5. Weekly salary in excess of $120, less than $200
F6. Weekly salary in excess of $80, less than $120

Illustration G. Classification of salary ranges.

The precise dollar range is not so important as recognition of the major groupings in the supervisory force.

3. Draft the usual "tree" type of organization chart, reflecting all the departments listed and the actual chain of command, with this important difference. The levels across the chart for each

organization "box" should correspond with the salary level to which the supervisor or department head belongs.

In order to ensure the greatest amount of use and coordination between the organization chart and the standby factors in the breakeven point, certain fundamentals in recording organization charts for visual flow of responsibility should be followed. Illustration H shows in simple form the organization chart of an average business producing products for profit.

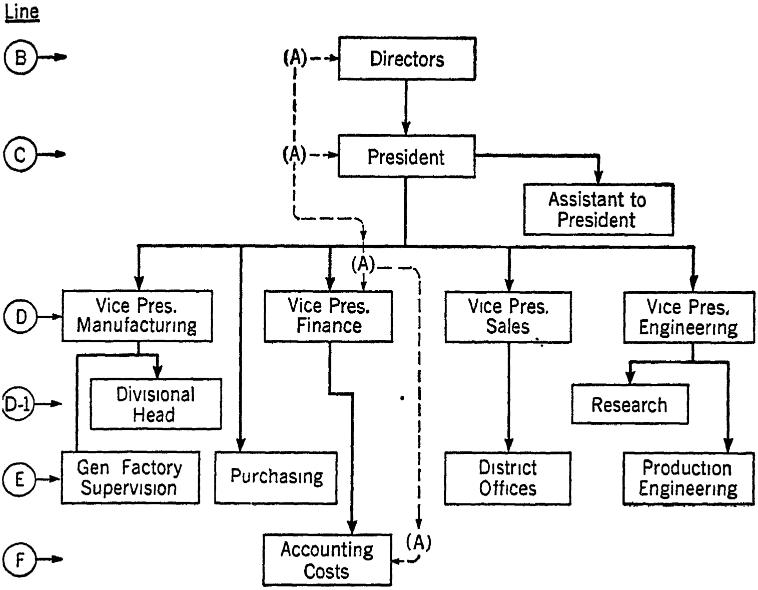

Illustration H. Organization chart, Wisconsin Manufacturing Corporation.

While the chart makes no effort to approach the many technical details and pros and cons in right and wrong of organization charts, it is made to illustrate two purposes. First, it shows the flow of authority downward from the highest authority to the operating authority (see flow A). This is the common and most generally expressed function in organization charts as followed today.

The best-developed organization charts show a second and just as important purpose, that is, they record levels of authority, responsibility, and pay across the chart. This is indicated by columns B to F, inclusive. When this is accomplished the chart has significant information and value not only this way ↓↑ but ⇄ or collectively ✥.

It is the belief of the writer that once standby and variable factors are established, organization structure will be composed of these two components automatically. The first component is the flow of authority on a comparable responsibility basis, and the second is the pay ranges. The flow of authority at the comparable basis has to do with the relative level of importance of the decision the individual has in deciding changes in breakeven and other commitments. For example, line D has the vice-presidents on an equal level as one looks across the chart from left to right, but while the purchasing department reports directly to the president, its standing on the organization chart shows the responsibility of the head of the purchasing department as an individual to be on a level lower than that of the vice-president but on a level comparable to that of district office and production engineering. This is represented by line E. Carrying the idea further, line F shows that the accounting and cost section in their organization status, as recorded across the organization chart, are at a lower level of responsibility for breakeven-point performance than purchasing or district office or productive engineering. The point we are attempting to make is that good organization structure records not only the flow from top to bottom or from bottom to top, but pay levels as well, and that it is tied in with the breakeven point by representative levels or steps from left to right which when combined with the flow from top to bottom or bottom to top completes the cycle of "boxing the compass" of responsibility and standby relationship.

If there is a job-evaluation system, the salary organization levels can be set to coincide with the salary grades at standard. The actual salaries reported in the departmental "boxes" will then serve also to check the salary- and wage-administration practice.

With such a chart, there is a graphic representation of the location of all the standby labor costs allowed in the breakeven plans. There is also a graphic portrayal of relative importance of the several departmentalizations to the extent that importance has been recognized by salaries paid. The chain of command and the anomalies of organization interest and influence begin to be apparent.

Conclusion. Organization structure must reflect the aim of the enterprise and, of course, the personalities that have been brought together to conduct the business. In these respects, each enterprise tends to be a law unto itself. Within these dominant considerations, however, delegation of authority and fixing of responsibility should be heavily influenced by principle to avoid the pitfalls that come with violation of principle.

Whatever the organization adopted, its structure generates standby costs. A symptomatic analysis of the organization will tend to justify the apparent standby allowed in constructing the breakeven-point controls or disclose the areas in which standby has arisen because of faults in the allowed structure. It should never be forgotten that standby costs are, to a large extent, a reflection of management tolerance. Therefore an analytical appraisal of the standby costs arising out of the organization structure itself is an essential of breakeven planning.

CHAPTER 19

USE OF BREAKEVEN POINTS AND CAPITALGRAPHS IN CAPITAL-EXPENDITURE DECISIONS

Introduction. Important to management is the problem: When should capital money be spent? And why? What are the factors which must be analyzed and weighed before management can make the important decision of further capital expenditures?

It is generally agreed that capital expenditures are made to improve quality, improve quantity, or reduce costs. But what is the dynamic thinking that should precede any decision? If the purchase of new equipment or other types of items which are capitalized (not written off against current costs) must be financed from available working capital, such expenditures become inadvisable when they bring the available working capital down to a level inadequate to support the projected sales volume resulting from the capital outlay. Analysis may indicate that the purchase can be most advantageously financed by a loan from outside sources; such a loan must be first found sound and then sold. All these conditions can be measured and evaluated by use of the breakeven point and capitalgraph.

Effect of Capital Expenditures on the Breakeven Point. The effect of changes in fixed capital (new buildings, tools, equipment, etc.) upon the breakeven point can be any or all of the following:

1. Lowered variable costs may result from changed labor, material, and burden requirements.
2. Standby costs may be increased by interest charges on money borrowed to pay for the capital outlay.
3. Standby costs will be increased to the extent of added depreciation on increased plant investment. There may also be

changes in both standby and variable costs if obsolescence is generated by the new capital expenditures.

4. Revised working capital position, expressed in financial capacity to do business as measured by the capitalgraph (see Chapters 9 and 10), will result from the transfer of capital to fixed plant from working capital, and because added capacity requires additional operating capital to put it to work.

Weighing all these factors, management can measure the calculated risk by answering these questions: What will the capital outlay do to our breakeven point? What will it do to our pickup above the breakeven point? Will we be in a position, financially, to support the projected sales volume as measured by the coordinator chart? Will our capitalgraph-breakeven relationship remain normal? (See Chapter 10.)

New Look at Tomorrow's Capital Requirements. The reason for capital expenditures in the future may be entirely different from those of the past. For 25 years the objectives of capital expenditures have been concentrated on a lowered productive labor content. Making easier the task of machine operators by supplying better equipment or by improving the flow of materials through the plant has influenced most capital expenditure proposals. These reasons, coupled with complete elimination of labor operations, have been the source of much increased capacity as well as investments in brick and mortar. The productive labor content of the average dollar of sales is now below 8 per cent. This was the 1953 average for American industry. In order to visualize the problems of cost reduction, as we look forward to tomorrow, it is well to review again where the dollars in costs lie and how the need for capital expenditures is changing.

There are three startling facts which must be given deep consideration before cost-reduction programs of any magnitude are projected into tomorrow's operations. First, the spread between manufacturing cost and the price charged the consumer has continued to widen. It is not uncommon today to find that a normal consumer's-goods item selling for $10 enters the channels of distribution valued at $3 or less. In other words, there are less than $3, including profit, for the creation of the product, and $7 in the costs of distribution made up of freight, shipping, warehousing, selling, advertising, installing, and servicing costs. It is obvious that these costs, beyond the scope of normal manufacturing, will require much more cost reduction in the future. The manufacturer is interested in these costs because as they increase out of proportion to the creative costs, it becomes harder and harder for him to sell his product even though he cannot directly control this last $7 of ultimate cost. High final selling prices may destroy the demand and thus leave a manufacturer with excess capacity and price-cutting threats to his already slim margins.

The second fact has to do with the shift in the elements of costs in producing the products of a manufacturing enterprise. In the representative $3 shown above, the average pattern allots 40 per cent to productive material, which is mainly the material, labor, burden, and profits of some other manufacturer. Only 8 per cent, as stated above, is direct labor to the average processor. The rest is made up of factory overhead such as supplies, inspection, maintenance of plant, supervision, clerical effort, production control, and other costs of this type plus profit. It is not uncommon today to find the overhead to be 300 and 400 per cent in dollars of true productive labor. With these new and revised proportions of the cost dollar it is evident that tomorrow's cost reduction must concentrate on material handling and overhead savings.

Third, we have hardly scratched the surface in expenditures of money for better flow of clerical records and to improve the methods of compiling, summarizing, and dispensing information to responsible executives. Our cost systems are generally antiquated and almost useless in running a fast-moving business. They are disorganized, inaccurate, and late and are often prepared by circuitous methods which break down time after time. It is evident that engineered cost-reduction planning should be applied to the clerical side of operating costs. A significant field for capital expenditure lies in methods to accumulate usable information for control at the level where money is spent, from which profit and loss accounting can be obtained as a natural by-product. A proper philosophy of product cost and inventory control can save thousands of dollars in the costs of keeping costs. But capital expenditures in this area can be wasted if no more is done than to perpetuate unsound methods on a mechanized basis.

If the average management does half the job in this field in the next 10 years that has been done in productive laborsaving devices, the costs of keeping costs will go down materially. Many of the clerical problems which now confront a growing organization will be minimized, first by more scientific methods, and second by a tremendous reduction of clericals who work mainly by the clock, accumulating late information full of errors and omissions and preparing the data with lack of visual proportions.

For example, so-called "mechanical brains" for the compilation of vital control statistics have been designed in the past few years. The airline business has found this equipment almost indispensable in their job of scheduling, loading on future flights, and guaranteeing reservations for customers. In a merchandising business with its thousands of transactions daily, these mechanical geniuses are absolutely essential to keep up with the paper work now required to record sales data, commissions, statistical information, and costs by lines, and for many other subdivisions of control.

The emphasis here is only for one purpose: to impress the executive with the fact that the cost reduction of tomorrow may come from a capital expenditure on an overhead item, rather than on a direct labor item. The field is lucrative because it has had less attention and because the field has become so complicated. Even hundreds of clerks are often too slow in the daily conduct of operating a business. The real field for tomorrow's cost reductions lies in the unseen overhead costs, in the costs of distribution, and in clerical operations, which together eat up better than half the cost of the average manufactured product.

Fallacies in Capital Expenditures. The determination of when and why not to make capital expenditures is a moot question. Supervisors in all levels of the organization can bring top management many thousands of ideas which individually may look worthwhile. The process of determining which ones should be carried out depends upon the availability of capital and how quickly the money can be saved by either standby or variable cost reductions.

It is a truism that there can always be proposed cost-reducing capital projects beyond the reach of even the richest business. It is probable that not even General Motors can spend all the money that its thousands of supervisors would like to spend for new equipment, new buildings, rearrangement of facilities, etc. The problem then becomes one of separating the sheep from the goats so that capital expenditure money will produce the greatest reduction in costs, with the greatest improvement in quality, in the shortest period of time after the expenditure is made. The breakeven factors and the capitalgraph are the best-known way to measure these delicate balances of value and proportion.

In the estimate of the savings and the time required to recover expenditures, men are prone to assume intangible savings in their calculations. For example, it is not uncommon in a capital-expenditure request to find that the new equipment is expected to save $1 000 in direct labor, and since the overhead rate is 200 per cent, to assume an aggregate saving of $3 000. Because standby and variable costs exist, the rate of overhead provides for two things: those costs related to volume and those which are a matter of time (standby costs). The latter costs usually cannot be discontinued. Under the circumstances, then, standby costs in general cannot correctly be included in potential savings on any individual project. To do so overvalues the potential savings from capital expenditures and prevents a fair selection from the requests for capital expenditure.

There is also some question about whether all the variable overhead costs (even though they do vary with volume) can be saved. The general rule that should apply in comparisons of capital expenditure and estimated cost savings is this: functional or unseen costs in a savings calculation should be removed unless the saving can be specifically demonstrated. To illustrate, the variable rate in the overhead may be one-half of the total overhead rate. In making a direct labor saving through capital expenditure, it may be impossible to reduce the variable portion of overhead applying to the "saved" productive labor. When this happens, there results a slightly higher variable on the remaining direct labor after the laborsaving device is in use.

Savings in direct costs are often offset by increased cost of indirect functions; more standby and variable overhead costs are required. To illustrate, a new machine costing $50 000 may greatly increase the material-handling costs (variable overhead) as well as the depreciation (standby overhead) while reducing other variable operating costs. Another illustration: savings in material costs (variable) can sometimes be made by adding inspection or other indirect charges which are either variable or standby items of overhead. Apply the plus and minus variable costs and the added or reduced standby costs to the breakeven factors before the saving was accomplished; then calculate the net gain or loss in the standby or variable factors and their effect upon the breakeven point.

It behooves top management to make sure that all claimed savings be real and factual. When direct savings are claimed, they must be supported by specific instances of how the saving will be realized, not only in prime costs, but also in all variable overhead costs. In the saving calculation, care must be taken to study and offset the effect of any added standby, such as depreciation, supervision, or production control.

Audit of Capital Expenditures Approved. It is important that management set up an auditing procedure of the statistical facts which were the basis for approving the expenditure and hold the people in the organization requesting the expenditures to the revised breakeven commitment, to ensure that the estimated time of recovery on the investment is as projected at the time expenditure was approved.

Extent of Capital Expenditure in Industry. In Chapter 2 it was stated that management had 75 billion dollars in plant made up of brick and mortar and machinery which must be recovered in future years. This money came from 25 per cent borrowed (external financing), 32 per cent from retained earnings, 24 per cent from depreciation funds, and 19 per cent from working capital. If a study of the last ten years is a normal pattern, the most natural way to recover the expenditures would be through depreciation spread over future costs. Normal depreciation is a standby cost; review the "laws of profits" (Chapter 6) to get the full impact of this factor in costs and breakeven points. At this writing, United States business is investing in plant at a rate far in excess of the depreciation included in the current breakeven point. Until capital expenditures again fall within the bounds of depreciation, normal breakeven points may reflect but a part of the total standby costs being contracted for and thus be understated. Of course, expansion of capacity and rising price levels have their share in the excess investment.

Computing Return on Invested Capital. The National Machine Tool Builders' Association of Cleveland recently published a study in machine-tool arithmetic which presents a simple method of checking each machine so that losses may be identified and dealt with. This group feels that many manufacturers hesitate to make new equipment purchases which instinct and judgment suggest, for "lack of convincing and specific evidence in dollar terms."[1]

Condensed, the guide is supposed to suggest three steps, the first of which determines what the new machine will save in direct labor costs. Here is an example: "The cost of the proposed new machine was $7 055. On the job under consideration, the old machine turned out 120 pieces per hour, whereas the new machine could turn out 200 pieces per hour. Assuming a direct labor rate of $1.50 per hour (excluding fringe benefits) and assuming an 8-hour day, comparative labor cost per piece was calculated as follows:

Old Machine	*New Machine*
120 × 8 = 960 pieces in eight hours or $.0125 per piece	200 × 8 = 1 600 pieces in eight hours or $.0075 per piece

The cost of 1 600 pieces then is:

On the old machine 1 600 × .0125 = $20.00
On the new machine 1 600 × .0075 = 12.00

Saving in each 8-hour day is...... $ 8.00

In short, the new machine costing $7 055 would save $2 083.20 per year in direct labor costs."

The guide continues by suggesting that the amount of fringe benefit in costs saved by the new machine can be calculated with reasonable accuracy as well as additional benefits which enable management to increase capacity without expensive building alterations or additions. It must be stated here, however, that intangible savings cannot be claimed unless they are specific and actually reduce a standby or variable cost factor.

Step 3 has to do with depreciation allowances and Federal income taxes, arriving finally at a calculation which determines the rate of yield on capital invested:

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[1] "Computing Return on Invested Capital," National Machine Tool Builders' Association, Cleveland, Ohio.

Return on $7 055 of invested capital

Annual savings..................	$2 233.20
Required annually for recovery of capital in ten years............	921.70
Annual net return on investment..	1 311.50

The presentation wound up with the conclusion that over a 10-year period, the entire capital investment will be recovered and meanwhile will earn $1 311.50 a year—a return of 18.5 per cent per annum. But this kind of savings report only records part of the facts, since it fails to express clearly the effects of the expenditure on the breakeven point.

We do not believe this type of calculation to be sufficiently comprehensive. While in itself it may be factual, it leaves too much to be assumed on the overhead composite results. If supplemented by breakeven conclusions this method will be greatly improved.

TABLE XLIII. EFFECTS OF CAPITAL EXPENDITURE ON BREAKEVEN POINT

Costs	No change in operations		Purchase $1 000 000 machinery financed by 20-year loan at 4% interest for $1 000 000	
	Standby cost per year	Variable cost per $100 net sales	Standby cost per year	Variable cost per $100 net sales
Direct labor....................	....	$10.80	....	$ 7.02
Direct material................	....	46.80	....	43.06
Factory burden................	$294 000	12.10	$394 000	9.68
Total manufacturing costs.....	$294 000	$69.70	$394 000	$59.76
Selling and administrative expense	184 500	7.65	184 500	7.65
Other (interest, etc.)...........	....	....	40 000	
Total all costs................	$478 500	$77.35	$618 500	$67.41
Profit pickup..................	....	22.65	....	32.59
Breakeven point................	$2 112 000		$1 900 000	

Use of Breakeven Points in Measuring Capital-expenditure Forecast. A more satisfying and comprehensive method of determining costs and savings resulting from a capital expenditure comes from the use of breakeven factors and breakeven comparisons. Table XLIII shows the cost before and after a capital expenditure is made. This is expressed not only in revised costs by elements but is also recorded in breakeven changes.

Because of this expenditure the breakeven is reduced from $2 112 000 net sales per year to $1 900 000 net sales per year, but better yet, variable pickup increases from $22.65 to $32.59 per $100 net sales above the breakeven point.

To complete the facts, however, a comparison drawn from the capitalgraph is necessary (see Table XLIV-A).

TABLE XLIV-A. EFFECTS OF CAPITAL EXPENDITURE ON BREAKEVEN POINT AND WORKING CAPITAL

	Before capital expenditure	After capital expenditure
Available working capital	$1 050 000	$1 050 000
Working capital sufficient for yearly sales capacity of	3 500 000	3 500 000
Profits (or losses before taxes) at:		
$1 800 000 net sales	70 000 loss	32 500 loss
2 400 000 net sales	66 000 profit	163 500 profit
3 000 000 net sales	202 000 profit	358 500 profit
3 500 000 net sales	315 000 profit	532 500 profit

Because this money can be raised by long-term financing it does not affect the working capital. It is also evident that while it increases the standby, a study of the results of this expenditure shows that it pays its way as soon as it is reflected in performance. Breakeven labor content is reduced by better methods from $10.80 per $100 net sales to $7.02 per $100 net sales. While the standby expense is increased by $140 000 a year, the total breakeven point is reduced from $2 112 000 net sales a year to $1 900 000 net sales per year. The fixed plant float is increased $1 000 000 offset by the amount borrowed as a temporary source of operating capital. The schedule of repayments under the loan agreement is also a schedule of working capital withdrawals to be made good from future retained earnings after dividends.

How long should it take to get the money back, 1 year or 10 years? The answer to this question depends on

1. Capital availability
2. The chances equipment will become obsolete before expenditure is recovered
3. Element of cost affected by capital expenditure
4. Economic life of the product being produced

Use of Working Capital to Acquire Fixed Assets. Sometimes it is necessary to make these capital expenditures by drawing on working capital. This is reflected by the comparison of "before" and "after" used in Table XLIV. Were the purchase of a million dollars' worth of machinery accomplished with only $750 000 of this amount secured by long-term borrowing, the balance of $250 000 would have to be taken, at least temporarily, from the working capital of the company. In a well-managed company this would not be done unless the capitalgraph formula indicated a sufficient amount of working capital to produce the added volume the equipment makes possible. Table XLIV-B demonstrates the effect of the drain of $250 000 from working capital.

From the table it is clear that the company sacrifices so much working capital to make the capital expenditure that it is worse off than before. The breakeven percentage has jumped from 60 to 75 per cent of the sales that can be financed with remaining working capital.

A comparative breakeven chart of the results in Table XLIII is given in Chart 36.

There is a reduction in the breakeven point from improvement in labor costs similar to the reduction recorded in Table XLIII. The reduction, however, so reduces the working capital that only 2½ million dollars annual sales can safely be handled after the capital expenditure is made; before the capital expenditure 3½ million dollars of sales could be financed.

Should volume be restricted by using working capital in order to reduce costs? Many a business has been wrecked because this problem was never resolved. Too often capital expenditures

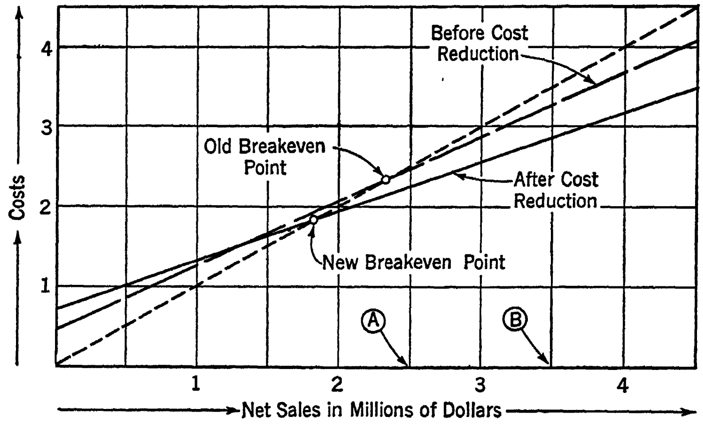
TABLE XLIV-B. EFFECT OF CAPITAL EXPENDITURE ON BREAKEVEN POINT AND WORKING CAPITAL

	Before capital expenditure	After capital expenditure *
Profit pickup †	$22.65	$32.59
Breakeven point	$2 112 000	$1 870 000
Available working capital	$1 050 000	$800 000
Working capital sufficient for yearly sales based on capitalgraph ‡	$3 500 000	$2 500 000
% breakeven point to maximum sales	60%	75%
Profits (or losses) at:		
$1 800 000 net sales	$ 70 000 loss	$ 22 800 loss
2 400 000 net sales	66 000 profit	172 000 loss
2 700 000 net sales	134 000 profit	Insufficient working capital
3 000 000 net sales	202 000 profit	
3 500 000 net sales	315 000 profit	

* $250 000 of working capital, $750 000 of borrowed money applied to plant investment.

† See Table XLIII.

‡ See Chap. 9 for details of arriving at float and variable factors and Chap. 10 for coordination to breakeven point. Table XLIV-B is the result of applying capital principles as discussed in Chaps. 9 and 10.



A Maximum sales volume after planned capital expenditure due to using working capital as source of funds

B Sales volume before drawing upon working capital for plant investment

Chart 36. Comparison of breakeven before and after capital expenditure.

are made with the hope that the working capital problem will "work out." That day is largely gone! Today's tax rates do not allow profits to generate working capital fast enough.

Each capital problem will be different, but the usefulness of breakeven points and capitalgraphs in justifying capital expenditures becomes more and more evident as competition forces reduction of cost in order to hold normal profit paths. Since cost reduction is now "the order of the day," there is no better use of breakeven points and capitalgraphs than to determine the advisability of making major capital expenditures which must be liquidated in future costs.

Capitalgraph Breakeven Coordination in Capital-expenditure Decisions. If the purchase is financed, even in part, through use of available working capital, it is usually necessary to curtail operations in line with the reduction in working capital. In other words, while *equipment* is the measure of a plant's *physical capacity,* the available *working capital* is the measure of its *financial capacity* to do business. The two must be in a favorable relative relationship to ensure healthy operations. In the foregoing illustration (Table XLIII) the company could purchase only $750 000 of its new equipment without distorting working capital. Often this expenditure of $750 000 or any amount less than $1 000 000 needed to do the entire job might not produce savings in proportion. For example, should an expenditure of $750 000 for added equipment produce savings of 10 per cent in direct labor, 8 per cent in variable factory overhead, and only 5 per cent in direct material, the savings would be only half the original estimate as shown in Tables XLIII and XLIV. This reduced saving might not be justified because the resulting breakeven reduction would be too small. A direct comparison of all possibilities to a before and after breakeven calculation can determine this answer with finesse and assurance.

It cannot be too strongly emphasized that using up working capital, even though it does result in a slightly lower breakeven point, often jeopardizes future operations. Maintaining production levels at the projected levels hoped for after the saving can be made impossible. It is through coordination of both the profitgraph and the capitalgraph, as was pointed out in Chapter 10, that management is able to obtain the complete picture of the capital risk involved in making capital expenditures.

Planning and Follow-through. Do you have a method to support requests and detailed reasons for desiring a capital expenditure in the first place? If not, some form on which to record the facts of what is wanted, the cost, and how soon and how much is saved should be prepared. Is there a real follow-up check on performance not only to control expenditure but to improve the technique of matching costs against savings as experience is gained in the process? Management requires a system of control which gives the information needed to determine whether or not policy on capital improvements is being carried out according to plan. One system found worthwhile operated along these lines:

1. The treasurer or controller submits a detailed cash forecast for the following year and a condensed cash forecast for the next several years. This is the basis for determining capital availability for replacement, for improvement, and for capacity expansion should any be justified.
2. All capital projects submitted are segregated into three classes (A, must; B, should; C, would like) before final consideration and approval.
3. The priority of projects is established, and items are listed by groups according to the time required to repay the original cost and the probable term during which the savings can be expected to continue.
4. The engineering department prepares an expenditure control sheet for top management. Continuous accounting control is set up to extend through the life of the projects for protection of management in final cost of project.

This procedure forces *advance planning* and gives current control over related jobs while they are in progress. Top management should know at all times whether or not more money is going to be required to carry out the program. If the cash is not readily available, the setup gives financial men time to plan necessary steps to secure the funds needed.

Conclusion. Nothing is more important today in the management of a normal business than reduction of cost. One way to reduce cost is better control, more efficient operation, and reduction of *lag* in going costs. This is working with what you have. When this normal cost-reduction function is exhausted so that the crumbs of reduction are meager, then management must turn to capital expenditure to make new and major cost reductions. These capital expenditures and their justification are involved because they deal with future operation and future values (long-time turnover values) which have their effect in standby costs.

The honesty of these values depends on the ability of a management to visualize a goal and to plan to meet this goal. The breakeven point with its supporting standby and variable factors and the capitalgraph with its supporting float and variable factors, tied together in a coordinator chart, are a means of visualizing the impact of capital expenditures on cost and supporting the need and justification for any program of capital expenditure. Remember that the pattern of last year's cost reduction applied to tomorrow may not be so lucrative because the areas requiring cost-reduction planning are changing.

CHAPTER 20

USE OF BREAKEVEN POINTS IN BONUS PLANS

Introduction. The word "bonus" in industry generally means a payment for extra effort. In cold logic, a bonus should be an extra amount over base wages or salary paid to increase productivity, which in turn enhances the profit possible for the organization making the bonus payment.

There has been much controversy between management on the one side and organized labor on the other side about the fundamental principles as well as the economics of bonus payments. Much of this controversy is shadow boxing and is the result of a normal tendency of these two groups to take opposite points of view. The economic question of whether bonuses for extra effort are sound is not a matter for decision here; interest rests on the effect of bonus plans on the breakeven point. It is further of importance that bonus plans create variable costs and not standby costs. The "laws of profits" (Chapter 6) should be rechecked for the impact of these two factors upon the breakeven point and the profit path.

Kinds of Bonus Plans. There are six general categories of bonus plans in American industry. These are

1. Direct incentive plans to increase the productivity output of hourly rated employees
2. Incentive plans to increase the efficiency of hourly indirect labor
3. Supervisory plans to encourage the supervision to improve shop efficiency
4. Clerical and office plans
5. Sales-compensation plans
6. Executive profit-sharing plans

Each of these kinds of bonus has its own general problems and characteristics, though all of them have a bearing on the breakeven point and the profit path which results from it. Shop incentive plans most frequently occurring in a "straight-line" form, such as piecework or "nonsharing" time-standard plans, stabilize unit labor costs above the bonus threshold. It is for this reason that "direct labor" follows closely a straight variable cost pattern in the profitgraph detail. Such plans are not our direct concern.

Damage to cost structure is most frequently met in ill-conceived "indirect" and "profit-sharing" plans. This chapter is therefore directed toward establishing better plans through application of breakeven knowledge and experience to group six, "executive profit-sharing plans," particularly, and supervisory incentives generally.

Direct and Indirect Labor Incentive Plans. Direct labor bonus or incentive plans are basically of two types: first, those based on one individual's performance as related to a predetermined standard; and second, group incentive plans which are designed to provide extra compensation for more than one person, usually a self-contained group or working unit. Both types are used quite generally in productive and nonproductive shopwork.

The hassle which often exists over the merits and demerits of the various incentive methods may always be present, but the problem of disagreement between management and the individual or individuals measured is usually minimized if the plan is sound. The secret of sound incentive plans lies in a good engineering study to support the time elements involved and a clear understanding between management and labor about the concessions which are to be allowed for unpredictable and unusual circumstances which arise from time to time in producing under an incentive standard. Many incentive plans become "sour" because no clear understanding of where concessions start and end is achieved, and because over a period of time scientific applied standards have been warped in application by poor managerial control and by verbal concessions, etc., which establish precedents. Downright disregard for the established, engineered standards has too often ruined the effectiveness of control and created misunderstanding between producer and supervision which grows with time. It is not uncommon today to find a plant with standards so distorted that the hourly earnings and the tempo of the producer are completely out of step with competitive conditions simply because management has not met the issues of changes due to revisions in shop methods, models, tools, and dies in corrected time studies.

In reviewing breakeven scatter charts it is often found that the cost element of labor, which should invariably be a variable cost, contains standby values simply because the standards on which individual efficiencies are paid no longer measure the actual productivity. As management establishes standby and variable factors to support the breakeven point, the discovery of standby costs in the scatter line in direct and certain types of indirect shop labor signals the need for reappraisal of the concessions made and conditions of work creating standby elements in costs normally entirely variable.

Indirect Incentive Plans. Most indirect incentive plans other than those which cover shop labor for increased productivity are based on profits. Do not confuse this with "profit efficiency," for most are paid on profits as dollars and cents rather than on the efficiency of the profits. The higher the level of authority covered by the bonus plan, the more common the method of payment based on dollars of profits.

There is a fundamental fact which cannot be evaded when absolute profits are the basis for determining bonuses. In such cases bonuses become windfalls at high levels of activity when no bonus is paid, because there are no profits. Unfortunately, management usually must work harder, be more exacting, and apply more discerning knowledge when businesses are below the breakeven point than when profit is easy to make. The basic principle of the popular method of paying bonuses based on profits is fundamentally and psychologically unsound. It is unsound because (1) high profits most often result from volume and not individual efficiency; (2) no profits or lack of profits are most usually the result of low volume; (3) the real factor of individual efficiency below the breakeven point is primarily one of working capital "protection." It should follow, then, that any bonus plan used to compensate executives, to be effective, should be based on the efficiency producing profits or losses (breakeven conduct) and on the utilization of capital (capitalgraph) rather than on dollars of profit alone. To illustrate by graph (Chart 37), profits should be paid to improve the profit wedge (Y) or reduce the loss wedge (Z).

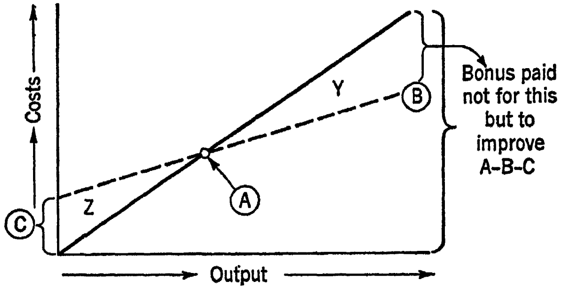


Chart 37. Basis for establishing indirect incentive plans.

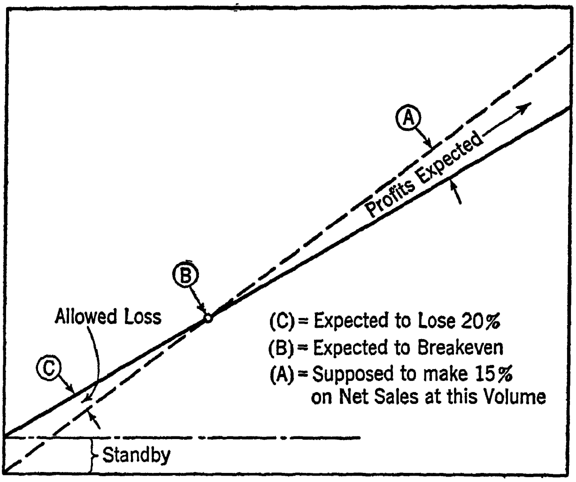
Bonus Plans Should Reduce Total Costs. Standby costs, as we have learned, are inflexible to volume because they are costs of time. Since bonus plans are by their nature extra compensation for extra output, they should be primarily variable costs, and as variable costs they are volume costs. The higher the organization level, the higher and more inflexible becomes the base pay. Consequently, a bonus plan paying extra compensation should be so constructed that the payments include the least amount of standby and the greatest amount of variable cost. Further, with a sound bonus plan the base pay (standby costs) is at a minimum.

Establishing Bonus Plans on Profit Performance. What are the objectives of management? At the beginning, it was stated that *management is the unseen force which drives all that is physical in obtaining turnover for optimum return on investment.* That is, management directs and coordinates physical objects in varied turnover cycles to produce a net profit and a return on the investment. The breakeven has previously demonstrated that any going concern (a concern which is operated to produce goods throughout a business cycle and which will not be liquidated or shut down) cannot possibly have zero costs at zero output. All going concerns have a breakeven point. As shown in Table XIV, the average breakeven point for American industry is slightly over 50 per cent of the current level of sales.

The problem of management from an owner's point of view and from the economics of our way of life is simply to manage. That means getting more than normal profit expectancy above 50 per cent capacity path and reducing the loss below 50 per cent capacity by reducing the breakeven point or by reducing the loss, through operating with lower standby and/or variable costs than the breakeven formula provides.

Any bonus plan which is to be effective in rewarding executives for real effort must take into consideration

1. The breakeven point and the factors which make it up
2. The capitalgraph and its supporting data



Bonus plans should not pay for realizing A, B, C. These conditions are expected. It pays for improving these conditions

Chart 38. Breakeven point of Wisconsin Manufacturing Corporation.

As an illustration, Chart 38 depicts a normally acceptable breakeven point; it represents operating proportions which any average management is expected to accomplish. Only by improving these proportions, thus increasing the profit potential or reducing the breakeven point, should top management realize maximum bonus payments.

In arithmetical ratios the profit on this breakeven point for the Wisconsin Manufacturing Corporation from 1 to 5 million dollars in sales would be as shown in Table XLV.

The point that must be emphasized again and again is that the 10.7 per cent of profit at 4 million dollars is no better a management job than the loss of 25 per cent at net sales at 1 million dollars. If the breakeven point and the standby and variables

TABLE XLV. ANALYSIS OF WISCONSIN MANUFACTURING CORPORATION COST OF PROFITS AT VARIOUS ANNUAL SALES LEVELS

Net sales per year *	Expected costs	Expected profits *	Expected % of profits
$1 000 000	$1 252 000	None	25.2 loss
2 000 000	2 025 500	None	1.3 loss
3 000 000	2 799 000	$201 000	6.7 profit
4 000 000	3 572 500	427 500	10.7 profit
5 000 000	4 346 000	654 000	13.1 profit

* Based on standby of $478 500 per year plus variable costs of $77.35 per $100 net sales.

which make up the breakeven point are an acceptable basis of operations for the company, in the view of all interested parties, owners, bankers, and management, this is the blueprint for which base pay is paid.

To maintain this profit path and not to allow the loss zone to get out of hand should be one of the reasons for a bonus or profit-sharing payment, but the greater part of any bonus, at least for high-policy-decision executives, should come through their efforts to increase the profit path or reduce the loss path. This increase can be accomplished in many ways, of which the following are the most common:

1. Increase the selling price.
2. Improve mix of product by increasing high gross-margin items in total sales (see Chapter 16).
3. Decrease standby or variable cost (see Chapters 14 and 15).
4. Make capital expenditures which reduce the breakeven point (see Chapter 19).

The full impact of these four factors on the profit path has been covered in the "laws of profits" (Chapter 6). A brief summary of possible action on these four items is repeated here:

1. A *change in selling price* increases the profit margin and reduces the breakeven point. Changes in selling prices may be

justified by many reasons, among which should be better quality which demands better prices (see Chapters 16 and 17).

2. *Emphasis should be on selling a high-margin vs. a low-margin item* and thus creating a better balance in the shipments produced. This can be accomplished by culling out marginal lines, dropping the so-called loss leaders which in most cases will not stand the scrutiny of hard-boiled management, with sentiment removed; the attendant reduction of obsolete or slow-moving loss-leader stock and elimination of small lots and similar barnacles which grew in lush times, causing high setup costs, distorted sales efforts, and high costs common in items which are "has beens," reduce both standby and variable costs.

3. May it suffice to reiterate that *capital-expenditure plans carefully made,* and conscientiously followed and executed, are a wide road to better profits for years to come. In fact, this is the biggest contribution of management to profits. In this area it takes more time to see the effect of a poor decision, either in cost not coming down as planned, or because an ill-advised capital expenditure has created more problems than it solved.

Reduction of Standby and Variable Factors. Great emphasis has been placed on eliminating *lag* in cost control and on better methods of measuring values than the static concepts of accounting presentation. Consistent application of these principles in day-by-day operations will reduce the cost line to hold or improve the breakeven point and profit pickup above the breakeven.

In the previous chapter the effect of capital expenditures on the breakeven point was discussed. From a bonus point of view, management becomes more discerning in its use of capital expenditures when the scene changes from free and easy growth during which need for capacity growth has overshadowed all other factors of good or bad judgment in capital expenditures.

In terms of the profit path, mere maintenance of proportions at high volume should not merit high bonuses. The bonus task is not as shown in Illustration I. It is, or should be, an improvement, as shown in Illustration J, and should also accomplish a reduction of the potential loss area as in Illustration K.

Good bonus plans will find a frame of reference in breakeven points and capitalgraphs. Improved coordination of cost performance and capital utilization as a basis for payment avoids paying executives entirely for the normal accretion of profits that

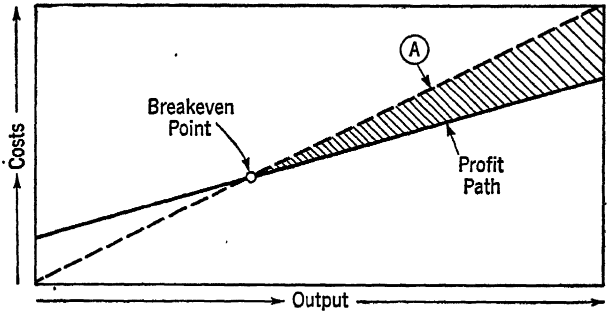


Illustration I. Profit path.

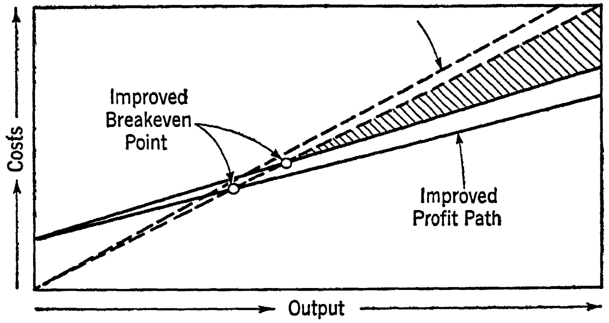


Illustration J. Profit path improvement.

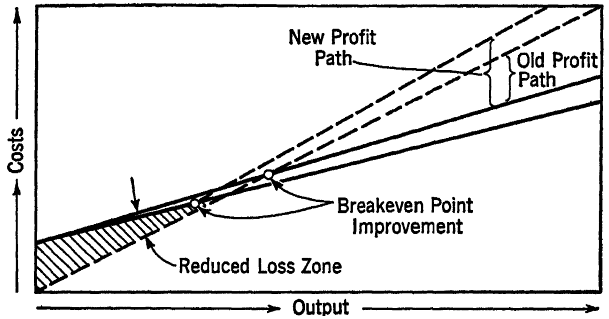


Illustration K. Profit path improvement.

come from volume alone. Repeating again, management works harder to control a loss at 30 per cent capacity than to make a profit at 80 per cent capacity. Unless this fact is clearly accepted there has never been a meeting of the minds between the management operating the business and owners who supply operating funds and depend upon management performance for stability in investment return.

Should Executives Be Paid Bonuses When Losses Exist? Bonus plans have been based on profits largely because of a fallacious reasoning that "you can afford to give bonuses only when profits are made." Is that reasoning sound? In the case example it was pointed out that management worked harder to control a loss of 24.0 per cent of net sales at 1 million dollars of sales than to produce a profit of 10.7 per cent at 4 million dollars of sales. There is no better time to emphasize reduction of a loss recognized by the breakeven concept than when one is being incurred. In a loss period the real problem of management becomes that of minimizing losses to protect the working capital. Reduction of the losses and diminishing working capital encroachment is just as important from a bonus point of view as the accumulation of working capital through high profit. So think carefully before making an arbitrary decision to stop bonus payments as profits disappear. When volume falls below the breakeven point for reasons beyond management control, there is always the task of fighting erosion of working capital even though there may be no possibility of a profit.

An Actual Factory Bonus Plan. Here is an application of the breakeven concept in a bonus plan for third- and fourth-level operating supervision. This plan illustrates several important considerations in its make-up.

1. Factors of payment are based on standby and variable realization tied in to the over-all breakeven point.
2. Departments are classed between productive and nonproductive and by size and importance into groups A, B, and C.
3. Bonuses are paid on *improvement of realization*, thus destroying the controversy which often results between supervisors over relative "tightness" of starting point.
4. Individual bonuses are based partly on division performance and partly on performance of the entire manufacturing organization to ensure "teamwork" interest without losing individual initiative.
5. The bonus is increased as the percentage of realization rises.

The plan follows:

Factory Bonus Plan

Wisconsin Manufacturing Corporation

The budget realization for the following departmental grouping will be used for determination of bonus payments:

I. *Factory departments*

Group A	*Group B*	*Group C*
Press	Assembly	Quality control
Enamel	Subassembly	Machine shop
Drill press	Purchase parts stockroom	Plant maintenance
Japan	Enamel and japan stockroom	Production control

II. *Factory service departments*

Group A	*Group B*	*Group C*
Warehouse shipping	Engineering	Repair parts
Yard crew	New tooling	Service
Powerhouse	Personnel	General plant
Delivery trucks	Purchasing	
Industrial engineering	Accounting	

III. *Total plant*
Factory departments (I above)
Factory service departments (II above)

Overtime will be allowed (based on previous experience and demonstrated pattern) for bonus-determination purposes only. In other words, the published budget statement will be adjusted for an overtime allowance purely as a memo. Bonus payments will be calculated on a dollar value per point of realization per man. Three methods of applying these values will be used: (1) full-point value, (2) 70% of full-point value, and (3) 50% of full-point value. The monthly values per participant per point of realization * are as follows:

	Full Value	*70% Value*	*50% Value*
In excess of 90%, including 95%.....	$1.50	$1.05	$0.75
In excess of 95%, including 100%....	2.00	1.40	1.00
In excess of 100%, including 105%...	3.00	2.10	1.50
All points over 105%...............	4.00	2.80	2.00

I-A. 50% point values will be calculated on total realization of factory departments (I above) and will apply to the following persons: [the names of 19 participants are deleted here].

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* Realization percentage is calculated by dividing budget allowed by actual expense on department-doing level before assessed expenses. The budget allowed is determined by applying standby and variable factors to the basis for control; these factors support the planned breakeven goal.

FACTORY BONUS PLAN (*Continued*)

WISCONSIN MANUFACTURING CORPORATION

II-A. 50% point values will be calculated on total realization of factory service departments (II above) and will apply to the following persons: [the names of 15 participants are deleted here].

III-A. 50% point values will be calculated on total plant realization (III above) and will apply to the following persons:
Factory department participants (I-A above)
Factory service department participants (II-A above)
70% point values will be calculated on total plant realization (III above) and will apply to the following persons: [the names of 15 participants are deleted here].

New tooling and extraordinary maintenance, which are both budgeted items, are allowed in the bonus-determination figures at the rate of authorized spending as the year progresses. In other words, the tooling budget would be corrected to the basis of final estimates for tools as a performance base. Increases or decreases in the original budget which may be due wholly to management decision and not decisions of factory supervision are thus incorporated to avoid distortion of actual performance in comparison with task.

Calculation of Above Bonus Plan. Calculations for this plan are based on the weekly and monthly control sheets similar to the ones shown in Chapter 14. This means that the actual accounting records as supplied to participants for control purposes are used to calculate their bonus. At the end of the months, from final control reports, a summary sheet is prepared explaining the bonus based on realizations as shown on the control sheet related to the bogey standards previously set up as explained by the plan outlined on pages 230 and 231.

Conclusion. Bonus plans, to be effective, must not be windfalls, especially when they affect the official who by his every act can destroy future profits. Perhaps today we believe too much in the slogan, "The world owes me a living." "Featherbedding" and abuses reflected in extra earnings have been magnified rather than diminished because of easy times. Sophisticated companies will correct these deficiencies as competition becomes more acute. There will soon be a trend to improve breakeven points by better bonus plans placing emphasis on a broader profit path. This will not come about by paying windfall bonuses.

To be fair and equitable to all parties, owner and manager, bonus plans should be rewards in the main for improved performance, not just recognition of incremented volume gain. Executives should not be penalized too severely, on the other hand, for low profits due mainly to low volumes beyond their control, provided that the greatest degree of efficiency possible at the volume available has been maintained.

These problems are not reconcilable without the breakeven concept. From it derives a breakeven point and a normal profit path at all capacities. Good management is paid to generate improvement by decision and action, and management men should be paid extra money in proportion to the improvement realized.

CHAPTER 21

USE OF BREAKEVEN POINTS IN SUPERVISORY EDUCATION

Introduction. The education of supervisors who make decisions involving values should have the development of better businessmen as its objective. Some levels of supervision have been given adequate training in communications, policy, and labor relations. In but few companies and for but a small percentage of supervisors has there been really sufficient training and orientation in costs, investments, and profit discrimination. The reasons for this deficiency fall into two general categories:

1. Static ratios as recorded by formal accounting are unsatisfactory for good, sophisticated control and cost understanding. Such ratios fail to segregate the reasons for profits, fail to segregate the long-term (standby) from the short-term (variable) decisions, and fail to show the effect of volume on specific cost problems, on the breakeven point, and on capital utilization. Confusion and misunderstanding attend the use of static factors to explain and understand profit results.
2. Since the early 1940s, industry has been in a continuous volume upswing. Except for slight setbacks supervisors have not experienced the problems connected with the softening or slowing up of business and the resulting cost conditions which round out the complete cycle of management problems. Since unpleasant experiences fade with time, the lessons of 1929 to 1932 and 1938 are faded and lost. Older supervisors have become indifferent because of the ease with which a profit dollar has been made over the present prolonged upswing period.

The real test of management, as most old-timers know, comes when business is hard to come by, selling prices are softening, and the cost of unit production is still increasing. One is quite impressed by the varied philosophies of management as they differ between the old industrial districts of the East as compared with the new industrial districts of the South, the Southwest, and the West. Several times in the past 30 years the first group faced the critical problems of cost control with its subsidiary problems of cost reduction which came during adverse volume periods. They are more cautious. They talk of profits with greater respect. They are preparing more efficiently through the educational process to meet any possible new catastrophe of economic changes which shrink volume generally. In the newer industrial areas whose key executives have not experienced severe or long setbacks, profits are thought to be easy to make. Few executives in these newer districts have adequate preparation or planned supervisory training to meet the issues of reduced costs quickly and efficiently if volume or selling prices weaken.

In a company which has not experienced anything but continued upswing, the author found a consensus that these "newfangled" cost ideas were probably good and an advancement over the old, but that executives had no intention of applying the ideas to their own business. Why? To let them express it, "If more profits resulted, management wouldn't know what to do with the money anyhow; the government would get most of it." With these thoughts in the minds of top management, how can supervisors, and the rank and file under them, be expected to obtain basic education in the philosophy of good cost control?

Industry has a major job in the education of those people who will be responsible by value decisions for the maintenance of the profit motive in the future. The time is *now,* not when an economic storm hits. When a storm hits, *lag,* which develops from not being ready either psychologically or physically either in education or systems, can "swamp the boat." When a feasible improvement is at stake, the time for action is always *now.*

What Is the Education Problem? The education problem is simply this. Remove the confusion that now exists in the minds of supervisors in their attempts to use and explain wide-swing variations in profit performance caused by high and low volume. The effect of performance is so smothered in profit-percentage variation that it is difficult, first, to explain and, second, to understand. For example, the Wisconsin Manufacturing Corporation in 1946, in adjusting from war economy to civilian economy, lost 3½ per cent on net sales before taxes. During the war period, 1941 to 1945, the profit was approximately 10 per cent, and in 1947 it had returned to 8 per cent.

Naturally the first impulse in using such a history to educate supervisors is to attribute these variations to volume. But were they? Is it a foregone conclusion that the company was just as efficient during the war years as it was before the war or that the conversion period was as efficient as the period before and after conversion?

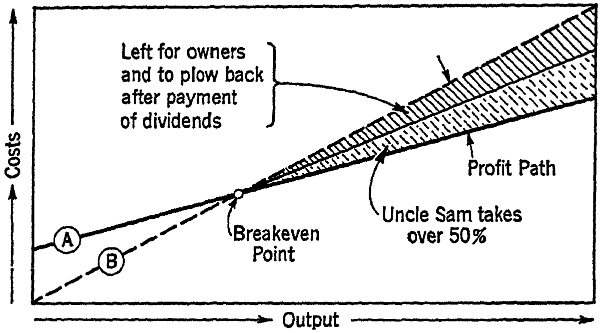

Illustration L. Breakeven point, profit path.

Lost in the shuffle through the use of static comparison is that part of the poor ratio which was due to performance. No good can come nor better technique be developed by a comparison of good and poor results which are accountable for by performance. This fault is overcome when the breakeven point is used in analysis, for by its use it is definitely possible to segregate the true variation in percentage due to volume changes.

The education program for supervisors is this simple. What is a breakeven point? Why is it? What is it? Does the company get *all* the fruits of the profit path at all volumes (measured by the enclosure made by lines A and B, Illustration L)?

Who Must Be Educated? There are four types of employees who must be educated in the principles of profit making, the sources of profits, and the use of profits:

1. Present top management
2. Future top management

3. Technical supervision
4. Hourly employees

Present Top Management. This group is made up of top industry men, leaders who head companies of all sizes and whose major responsibility is to keep in balance the quality-quantity-cost tripod. These men must be able to distinguish both in actions and in words between those problems which must be faced today and those which must be anticipated for consideration later. These men must also keep the business supplied with available capital so that it can perform a satisfactory job. But most important, they must know how to tell others these things, not in bombastic generalities, but in smooth, interlocked facts which can be understood and evaluated by all who follow direction.

Hunch Executives. These executives as a whole generally understand corporate profits because they are faced with them every day. They have attained their position because they have shown a knowledge and an ability to comprehend and balance the monetary proportions involved in operating the business. They deal in broad, over-all summaries, not specific details. They still use "hunch" and experience too often in new decisions because not enough facts are available pro and con in summary form to shade facts. They are creatures of habit and as such often fall back on the old way when the problem is acute, primarily because the old way worked last time.

Most of these key men do a better job of personal comprehension of the management and evaluation problem than they do of explaining profits to other groups under them and to the public. The reason for this lies in the use of static values and ratios for formal figures to explain their desires and express their results. It has previously been explained that these static figures are inflexible because they are unable to flex with changing conditions. The three reasons for profits are not clearly segregated. Let us review these reasons.

1. Profits are the results of volume and vary materially with changes in volume.

2. Profits are the results of performance on any given volume measured in standby and variable realization of detailed cost summarized to variations in profit and loss.

3. Profit changes due to mix of types of products sold compared with normal mix.

Until these three types of profit problems are segregated, the picture of what caused specific profits results for one accounting period is confusing. When attempting specifically to measure tangible changing things, the learner must evaluate the effects of volume on profits if he is to get positive and concrete understanding of the processes which produce profits and understand the boss who is directing the profit processes.

Future Top Management. This is the group who, because of lack of experience or age, have not yet gained the peak of their potentialities. They some day will fill the vacancies left by group 1, people who retire from the actual operation of the business. This group naturally is somewhat short in the ability to express and understand profits because of lack of experience and because the first group has not been too versatile in training them except by trial-and-error observation. It is clear that group 2 will learn no faster than group 1 teaches, except by the laborious, time-consuming trial-and-error method. In this group must the most emphasis be placed on real profit education—in *dynamic* terms.

Technical Supervision. This group consists of professional supervisors, such as foremen, district sales supervisors, technical engineers, research, servicemen, and employees who have risen from the ranks because of special aptitudes or who, by technical training, are qualified to direct and supervise the people who work by physical effort. This is a very important group in the process of learning how to evaluate results. As a whole, this group understands very little about the profit motive and the underlying factors. It is important too, because this group fills the gap between groups 1 and 2, and it is vital that they know "why" profits vary and what happens to profits. Until they understand why profits vary, they cannot defend them. Yet defense will be one of the most important jobs in the next few years in squaring away much of the present conflict between men and management.

Hourly Employees. The fourth group of employees, usually hourly rated, is quite confused concerning the "why" of profits. They have seen so-called "high" profits year after year in the past decade, have listened to false rumors, and have forgotten the existence of low profits and losses in the 1930s. They are the people who are firmly convinced that all the efforts of the boss and others to explain profits is "propaganda" by high executives who are going to take large bonuses for themselves or pass on to the company's stockholders excessive dividends. In the past 10 years this group has heard the generalizations time and again at union meetings that high profits and high salaries are always unjust.

What all groups need is a better understanding of what profits are and how they are come by. And the understanding of group 4 is dependent upon the ability of the others to express their understanding of these facts:

1. Profits are the results of performance, volume of sales, and the kinds of goods sold.
2. The three go hand in hand.
3. In order to replace equipment, to advance new ideas, and to create new jobs, additional money over and beyond the needs of meeting the payroll and buying the material which goes into the product is necessary if American industry is to offset the world's highest wages with "know-how."

Why Your Problem Is More Acute than It Was in the 1930s. The problem of educating the groups can be made as plain and as clear as a ringing bell if those in groups 1 and 2 will put some time and energy into solving it.

First, instead of talking about profits in terms of 10 per cent results, understand the factors pertinent to a 10 per cent profit or loss:

1. *The breakeven point,* which is supported by standby and variable controls in the several departments supervised by group 3 and operated by group 4.
2. *The pickup above the breakeven point*—that amount of money which must be earned above the breakeven point to ensure average profits:
    - *a.* To offset losses in bad years.
    - *b.* To provide reserves in strength of capital structure to pay for the growing requirements of unemployment protection, old-age benefits, community services, and employees' benefits and perquisites.

c. To provide capital for new plants and equipment and research in excess of the depreciation recovered in costs. In the past, this requirement has tended to run in cycles. While depreciation reserves have been adequate in some companies to replace worn-out equipment, they have never been adequate to provide for new plateaus of industrial development which result in new buildings, new equipment necessary because present equipment becomes obsolete, and similar cash-consuming projects which are a part of a major revamping in our industrial growth.

d. To provide a return on the investment for stockholders. While management may never, on the surface at least, be able to sell this requirement to the worker, the problem will become easier with time since many workers are now stockholders and as such these new owners are beginning to expect a return on their investment. While many attempt to discredit this reason for profits, they themselves hope for profits. This makes management's best defense of the profit philosophy a good offense.

e. To provide the profits necessary to assure the company an adequate liquid surplus for reinvestment funds required for normal working capital requirements to protect a growing business.

f. Something extra as incentive for those people who through unusual efforts in time and energy are able to produce better than average profit performance as measured by the breakeven concept of profits at any given volume.

3. *Adequate profit will result eventually in lower selling prices.* While selling prices may move up or down, depending upon the demand of people for the goods coupled with the desire of management to use the plant to maximum capacity, the real test of whether selling prices will be reduced over the years depends upon the ability to reduce costs. The size of the wedge of profits known as the pickup above the breakeven point is the ultimate determinant of profits and the backdrop to the whole problem of the possibility of selling-price reduction. Until we can clearly demonstrate the tremendous impact that volume has on profits during any given period to those people who must support profits

tomorrow, we will continue to jumble the entire problem of why profits vary.

How to Get *Time* in Profit Education. The first step, which has been reiterated so many times in this book, is to be able to explain and demonstrate with actual figures the reasons for variations in profits. Let us repeat the reasons:

1. Volume of output
2. Performance on a given volume of output and capacity utilization
3. Effect of the mix of product and selling prices as the internal composition of sales changes between high and low gross margin products

We found in the case of the automobile that it is not safe to say that it costs 8 cents a mile to operate. Such a statement is a collection of all of the factors involved in an 8-cent cost with no discerning segregation of the effects of high or low mileage, good or poor performance, etc., on the costs in question. When it is stated that the car costs 4 cents a mile plus $360 a year to operate, not only can the costs for any given mileage be projected, but from these true costs a measure of operating efficiency can be determined at any volume. The relationship between unit costs can be established at all volumes and can be related to each other. If the car is being rented out for an income per mile, not only can the breakeven point be determined, but the profit path potentials can be clearly illustrated.

Similar factors grounded in the facts of the particular business coupled with an ability to sense the true reasons for the variations from plan explain the profit path, which is the result of selling-price and costing relationship. Supervisors can then comprehend static profits at a given level of output and reconcile and discern true variations in profits as a profit period unfolds.

Regardless of their station in business and the degree of their responsibility for the profit path, many supervisors do not know why static ratios are unfair, but feel that management should. They sense that an 8 per cent ratio at one level of activity is too high, and that the same ratio is too low at a higher activity. Supervisors resent being told what a rotten job they are doing, knowing the results are caused by falling volume. Though they cannot measure the impact of this condition, nor express themselves in the ratios which explain it, they believe that the boss should be able to understand and express these conditions, especially when only a few months before the same boss told them how good they were (high volume at that time made the ratios look good). The resentment is magnified when the supervisor feels he is doing a better job today than at the time he was praised. This unexplained distortion never leads to respect for high levels of authority and destroys his desire to learn from his boss; he wonders if the boss "knows the answers."

Esprit de corps is lost by asking for impossible goals just in the hope that something will be done. To ask for an impossible ratio when business is falling in the hope that it may drive costs down is a managerial "witch hunt" not resorted to by effective management. The only way to ensure cost reduction is through standby and variable segregation, so that the goal is an orderly, visual requirement. Whether that challenge be a normal task or a task marked by managerial directive matters little, for the proportions in the process of conversion can be reasoned and understood.

Conclusion. The education of supervisory forces into the intimacies of good cost requires an understanding of the problem in its component parts.

$$\text{Sales} - \text{costs} = \text{profits}$$

Costs are standby (time) and variable (volume)

All can then be expressed as a breakeven point from which dynamic facts of proportion can be related; accounting records can then support these facts, not confuse them.

A growing supervisor needs this understanding. We owe him that much, for the present "blind-spot" conflicts in profit thinking are not making our way of life better understood.

Our way of life is the profit system, and some real education in its fundamentals is good for all of us. To operate any other way will not ensure stronger future management.

CHAPTER 22

USE OF BREAKEVEN POINTS IN LABOR RELATIONS

Introduction. How much longer management will conduct its basic labor relations with a defensive, defeatist attitude depends entirely on how long it will take for management to realize that organized labor is here to stay and that it knows what it wants.

Many of the critical aspects of the failure for there to be a meeting of the minds of labor and of management have been, and will continue to be, created by management's failure to face the issues squarely and evaluate the issues in breakeven concepts. In brief, what is the basis for labor-relation conflicts?

The Basis for Management and Labor Conflicts

1. Under our form of government, it cannot be denied that groups have a right to protect what they think are their interests.

2. So long as there are Democrats and Republicans, Fords and Chevrolets, rich and poor people, there are going to be differences of opinion varying from close approximations to diverse variations. Why two minds reach two diametrically opposite points of view on the same facts will continue to be hard to explain, but often there is logic on *both* sides.

3. Profits have been high since the upswing which started in the 1930s in absolute dollars rather than in real dollars and high in percentages because of tremendous volumes. It is increasingly hard for the men who work with their hands to accept the idea that they are getting a fair share of the values created by productive activity.

4. Labor leaders have magnified many of these problems because their jobs depend upon it and because it is good business for them to be overbelligerent as part of their militant program

to organize, supervise, and deputize those people not classified as part of management.

5. Labor leaders can and do use high ratios of profits caused by volume at the high levels of capacity to get pay increases but put no emphasis on the effect upon the resulting breakeven point nor upon the permanent pickup above the breakeven point. But why should they? Management does nothing itself to stress this point except in broad general expressions which are frequently misunderstood by the rank and file.

"Every Workman Is a Miniature Corporation." What it costs you just to get by—enough to keep body and soul together—is what corporations call the "breakeven point." Whatever you earn above that is "profit" which you can use as you like—for savings, a car, a better home.

It is the same with a company—what is earned above the "breakeven point" is spent for better equipment, or saved for carrying the business through depressions, or invested in new products. (Only a small part goes to the investor, who made the company possible.)

Since 1929, the "profit" of the average American—the excess over necessities—has increased 302.7 per cent; the profit of the average American corporation has increased 134.5 per cent.[1] Worth remembering, when the soapbox orators scream about "excessive profits." When will they begin objecting to *yours?*

If a company has been operating at maximum capacity for several years, the profit wedge in the profit path is at a maximum without increasing prices as reflected in point A of Illustration M. As the peak period lengthens, labor continuously clamors for a greater percentage of the take. It is extremely hard for management to explain that over a normal cycle of business, any company runs the gamut of average output capacity, which includes low output and high output. Low output is illustrated by point B in Illustration M.

One may quizzically think or say that is all well and good, "but they won't listen to all this theory." Remember, many discerning people did not listen to the theory that the world was round for a good many years. It takes time, patience, and sin-

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[1] Source: U.S. Department of Commerce.

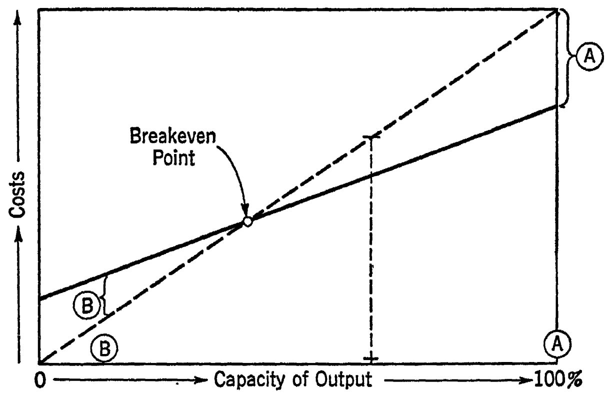

Illustration M. Comparison of breakeven points.

cerity to have people come around to a distant fact such as, "No, you won't fall off the edge of the world if you sail westward."

How to Use Breakeven Points in Labor Relationships. In a journey of a thousand miles the first step must be taken first. Labor must be educated to the facts of profits, which can only come after management is so educated (see Chapter 21).

1. Educate supervision, the spark plugs between management in thought and management in motion, so that they know what they are talking about and can evaluate profit in other than "half-truths."
2. Impress the workingman with the fact that the profit motive is basically sound because it provides the *only* chance for growth and reproduction on a free basis.
3. Realize that the sophistication of the average American workingman valuewise has improved tremendously in the past 16 years, and he no longer can be treated like a child.

All this requires a better understanding of values, which we are convinced must be expressed in standbys and variables, directly or indirectly, and thus in the profit path which shows, first, a point up to which no profit can be made, then a point at which profit should start, and finally, a point at which profit must accrue in high amounts to protect against the area of losses.

Many companies are writing annual reports slanted for employee understanding. These should be encouraged and continued. We believe, also, that interim reports should be more simplified and that they can be used constructively in good labor relations. Since any discussion of differences of opinion between management and labor must be factual to have value, and must bear its weighted part toward the breakeven point, it must take into account the segregation of time and variable costs so helpful in managerial control.

We believe greater mutual understanding of values can be achieved across the table, and while, at times, management will wonder if labor has made any progress in this direction, both must always remember that the educational process is a slow one. Management has certainly not gone too far out of its way to date to improve the situation.

Going far to fill one of the biggest gaps in an appreciation of the need for profits is "Seed Money," a pamphlet published by the McGraw-Hill Book Company, Inc. It shows the necessity for the tremendous amounts of so-called profits which must be plowed back into the business in excess of depreciation allowed in costs.

Below is a simple illustration of the effects of a 15-cent-an-hour increase in the XYZ Manufacturing Company. The following is known about the company:

Sales are $10 000 000 per year, or 90 per cent of capacity.

Selling prices are highly competitive.

Labor is 50 per cent of the costs, and a 10 per cent profit on sales was realized last year.

Based on these formal data, labor puts up a good case for a 15 per cent raise in wages, an amount equal to $675 000, and two-thirds of the net before taxes.

$$\frac{\$10\,000\,000 \text{ sales} \times 90\% \times 15\%}{50\%}$$

If a breakeven point were known and supported, the company would not look so good (see Illustration N). Now, add the $675 000 labor increase to variable costs (Illustration O).

New variable costs	$0.87 per dollar net sales instead of $0.80
New profit pickup above B/E	$0.13 per dollar net sales instead of $0.20
New breakeven point	$\$8\,000\,000 \; \frac{\$1\,000\,000}{\$0.13}$

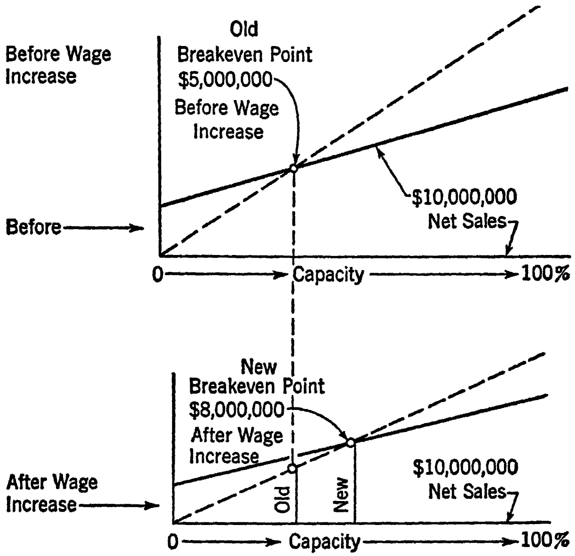

Illustration N (*top*), Illustration O (*bottom*). Effect of capital expenditure on breakeven point.

After the increase the company cannot fall below $8 000 000 net sales to break even or it must raise its selling prices to retain its old breakeven point, either of which affects future prosperity and eventually the workers. This type of a presentation will help the worker understand the interplay of costs and profits, if he is only given a chance, by explaining the breakeven picture in his language. Illustrations N and O are almost self-explanatory.

Conclusion. It is not our intent to say that breakeven thinking will or should stop labor problems. Our purpose is to show how the pros and cons can be explained in a simple and compact presentation which can be read and interpreted by either side in a labor problem involving higher costs.

Whether this nation can continue to "have its cake and eat it too" only time will tell. To measure the impact of labor concessions along our economic road as these changes affect the costs of running a business, breakeven presentations will present a clear and concise recording of the net results of added costs vs. greater efficiency. With good breakeven technique, the net trend effect on profits will exert itself by positive and visual changes in breakeven relationships.

CHAPTER 23

USE OF BREAKEVEN POINTS IN DIRECT COSTING

Introduction. In 1925 when the author first started to work in the General Electric Company on breakeven points and standby and variable costing, there was very little information available concerning the breakeven field. The one or two dissertations which were in existence at that time were written from a highly theoretical point of view and had more to do with the engineering theory of the straight line as generally applied to a scatter chart than to cost control. In the early 1930s it was still almost impossible to find any technical information concerning the problems involved in the segregation of standby and variable cost, which are the major problems expressed in scatter-chart determination.

During the late 1930s, casual reference to breakevens and their supporting components began to appear in some technical magazines, and it was not uncommon to find random mentions of the breakeven point in the proceedings and records of such technical groups as the National Association of Cost Accountants. Today hardly a technical talk on cost, selling prices, profit, distribution, and general management which involves consideration of profits can be found which does not in some way express the applications of the problem of breakeven point or breakeven control. One of the most recent of these presentations has been a booklet under the auspices of the National Association of Cost Accountants titled "Direct Costing," which is an attempt, for the first time, to separate the so-called "fixed" from volume costs and exclude this *time* component (fixed costs) from inventory valuation.

What Is Direct Costing? What was considered to be the best costing method before direct costing was used? Basically we are referring to those costs which accrue in the production of goods as a part of the cost of sales.[1] As usually listed, direct material and direct labor (prime costs) plus factory overhead or burden make up the total cost of manufacturing. The practice for many years has been to price inventory at the aggregate of these values either on an actual or a standard basis modified to follow general accounting practices of using "cost or market," whichever is the lower. If costs were kept on an actual basis, most excess material, excess labor, or excess overhead costs, even when known, were included in the inventory valuation as a product passed through work in process into and through stock on its way to be costed out as cost of product sold.

Under present generally used costing methods, the value of balance-sheet inventory may be cluttered up, not only with excessive prime costs (direct material and direct labor), which can be seen in the product, but also with excessive overhead values, depending on the efficiencies at inventory-taking time. This element of cost could further be distorted if volume is above or below normal at the time in question.[2]

When inventory is increasing, it is conceivable in any company that depreciation as well as other items of standby (*time*) costs of prior operating periods are being stored on the shelf. They were included in the inventory value in months past and, to the extent not sold, still remain as work in process or finished parts in book and inventory values. Direct costing is a method of eliminating the standby element of shop costs, which by their very make-up distort so-called *time* costs and allow them to remain in inventory after this *time* has passed.

Direct Costs Are Nothing but Variable Costs. Direct costing, therefore, is nothing more than a rough attempt to eliminate standby costs from inventory variations. It has been stated previously in this book that standby costs are costs of *time*, found primarily in overhead or distributive segments of costs. As such they do not vary without major management decisions as volume goes up and down. In setting an overhead rate to be used in actual or standard costing, the acceptable or total overhead rate carries standby costs; in fact, the rate carries all the standby cost that is included in the planned or actual cost of sales at the normal output level where the rate was set.

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[1] Fred V. Gardner, *Practical Costs and Cost Controls Manual*, 1954.

[2] *Ibid.*, "Setting Normal Rates of Overhead."

For example, the overhead rate in the Wisconsin Manufacturing Corporation is a composite of 213 per cent. If this rate is analyzed, however, it will be found to be made up of $1.13 variable or volume cost and $24 500 a month planned standby cost. For the normal production labor on which the overhead rate is based, labor is expected to be $24 500 a month, and the standby provision in the rate is an average 100 per cent of direct labor.

Under direct costing the standby overhead of $24 500 a month would be written directly to the cost of sales by lines of products monthly, and inventory would be charged only for the variable element of the overhead, which in the illustration used here is 113 per cent of standard direct labor. Let us see the difference this would make in the case of a product or part as valued for inventory (Table XLVI).

TABLE XLVI. OVERHEAD RATE INCLUDING STANDBY AND VARIABLE COMPARED TO OVERHEAD RATE INCLUDING VARIABLE COSTS ONLY

Inventory valuation	Including all overhead, standby and variable		Including only variable overhead	
Direct material		$20.00		$20.00
Direct labor		2.00		2.00
Overhead	213% =	4.26	113% * =	2.24 †
Total inventory valuation		$26.26		$24.24

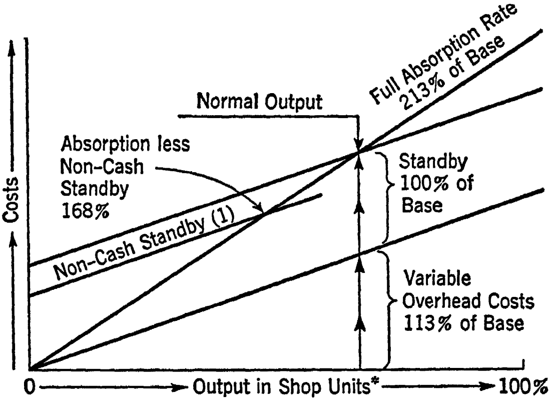
* Variable portion of overhead only—does not include any standby overhead.

† Balance of overhead (standby portion) would be charged directly to cost of sales by lines or other control subdivisions.

This difference of 100 points in the charging rate (213 per cent − 113 per cent) is the amount of standby cost which would never reach inventory under direct costing, and which would be charged to cost of sales at the rate of $24 500 per month, or $294 000 in a 12-month accounting period.

The impact of direct cost (variable costs) as compared with total costs (variable plus standby) is shown in Chart 39.

Advantages of Direct Costing. When a proposal of this type comes up, accountants take the pros and the cons into years of controversy concerning the merits and demerits of the new idea.



*In this case refers to direct labor dollars
(1) Such as depreciation, unused reserves and similar charges to costs not actually expended.

Chart 39. Comparison of overhead rates—full overhead vs. direct costing method.

For example, the existing controversies concerning the pros and cons of depreciation, standard costs vs. actual costs, and similar problems have become so involved that no real settlement has been reached about what is right and what is wrong, especially in the minds of the management layman who must wade through all the controversy to get a point of view. Because of this, it would be worthwhile for anyone who is facing the problem of inventory valuation to read NACA bulletins on this subject for background. If interest lies in management of inventory values rather than accounting technique, the final answer should resolve around, "Should standby costs which support the breakeven point be eliminated from inventory value?" Keep the problem that simple! The advantages of direct costing may be few in number but important in management concept. They might be summarized as follows:

1. Inventory variations are kept at a minimum; inventory valuation always represents controllable items of cost.
2. Pricing inventory at the minimum value reduces the hazards of losses due to obsolescence and reduces the cost of personal property taxes; the cost of insurance and costs of similar nature may be affected by inflated or deflated values.
3. Writing off the standby costs each month direct to cost of sales prevents carrying forward as part of the inventory a value which may result in taking losses in the wrong tax year.
4. Each period's sales are then costed as if the manufacturing rate matched the shipping rate. At 100 per cent performance of material, labor, and expense standards, the cost of sales is correctly stated at "actual" for the volume of shipments.

Somehow the standby of the average company begins to look small when it shows up in several departments. It is even less significant when part is buried in inventory and part is buried in costs of goods sold. These segments become so minute at times because of the many accounting subdivisions that the real impact of the total standby value may be lost. If for no other reason than the above, standby should be kept separate and written off once each month. The importance of standby is reiterated and again forced to the front each time the books are closed.

Conclusion. Direct costing in itself does not refer specifically to standby and variable elements; it is nothing more than an attempt to state as a separate costing element the standby portion of total costs. Whether this process is done scientifically or roughly depends upon the knowledge and use of breakeven concepts in the organization, the attempt to eliminate "fixed charges" from inventory values. Such fixed charges are actually all or part of the standby elements which support the breakeven point.

Direct costing will be given much attention by industry in the next several years since it is a method of assessing costs to the operating years to which they properly belong. Direct costing presumes a knowledge, measuring, and understanding of the standby and variable elements of cost, which are the basis and detail of the breakeven point.

CHAPTER 24

USE OF BREAKEVEN POINTS IN RETAIL COST CONTROLS

Introduction. Most of those who read this book may get the feeling that it is primarily developed to help manufacturing companies because it has put little or no apparent emphasis on the retail aspects of the cost or profit relationship. This is far from true; the principle of the breakeven point in the techniques of cost control, especially overhead costs in a retail organization, is fundamentally the same as in manufacturing. The detailed process is just as simple to install and just as forceful in constructive cost control as the comparable principle applied to manufacturing costs and profits.

Problems of Installing Variable Budgeting in Retail Organizations. Establishing variable budget control in a retail organization requires adherence to the same basic principles as in any type of business. The two common denominators are (1) base or reason why money is spent, and (2) the costs necessary to conduct the operation.

In a selling organization, usually the dollar of sales is not as good a yardstick as transactions to measure the work load in the act of producing profit. This "base" requirement (see Chapter 8) also applies to the use of units rather than dollars in the indirect departments which serve the selling departments, such as accounts receivable, payroll, receiving, shipping, housekeeping, and maintenance departments. These are the types of departments referred to as indirect departments. The use of a unit base for control in retailing is a natural because in most retail organizations the number of transactions and the work load are fairly well spelled out as a part of the daily routine. The number of transactions by departments is not only a nearly universal measure of actual volume but is also a basic raw material for augmenting static details with the advantages of variable budgeting and breakeven-point philosophy.

The following points will be covered in order that one may visualize the applications:

1. Applications of variable budget techniques to selling departments
2. Applications of variable budget techniques to nonselling departments, as they are supported by standards, work simplification, and other management tools
3. A study on allocation of indirect costs to selling departments, with specific illustrations of how breakeven techniques are wonderfully applicable to each department as a tool for improving net profits
4. Single-expense accountability and organization control to earn a profit
5. Keeping the management on a profit track, combining departmental gross-margin factors such as sales, mark-on, markdowns, shrinkage, employee discount, discount on purchases, and workroom costs with sales and expense planning to arrive at a profit plan for a year in advance
6. Specific applications of weekly variable budget reports in both selling and nonselling departments

Applications of Variable Budget Techniques to Selling Departments. Like direct labor, selling is the productive endeavor of the retail organization. From it, sales stem as the results of first buying, receiving, and displaying, and, after selling, of delivering the goods sold. Selling is the final glorious process of turnover and correct competitive markup. Unlike direct labor, selling can be visualized and is measured in units, and the process of markup and markdown is a well-regulated procedure in the average retail enterprise. This means that both the units of value and the cost of selling are cleanly measured in the selling conduct by units of effort.

It has previously been stated that wherever money is spent it is spent for some reason, and if that reason is known there will be a combination of variable and standby (*time*) for the costs created in order to make the sales. Since the units of measure are so clearly defined in merchandising sales, it follows that the control of costs to units of selling endeavor and the measuring of expenses to create that endeavor are even more clean-cut and easier to analyze than they are in the average metalworking or manufacturing industry. Thus, establishing a variable budget in selling organizations using the units of selling effort or selling results for the reason for spending money to control all labor costs from commissions to salaried selling people is a simple, concise, and practical job. It is further facilitated by the fact that the natural departmental lines and types of goods sold in the average department store provide the necessary accounting centers to ensure adequate departmental demarkation of the costs expended.

Applications of Variable Budget Techniques to Nonselling Departments. Similar to their prototypes in manufacturing, nonselling departments are of two basic kinds:

1. Service departments feeding the sales or producing department with material, taking sales away, determining values, keeping the store clean and at the right temperature
2. Staff departments which have functional responsibility in helping the producing departments do a better job of display, advertising, flowing, recording, and paying the people who sell and service the sales units.

As in a manufacturing organization, the final cost record for any line requires allocation of this nonproducing department's expense to producing lines. As in manufacturing, these unseen final costs as they record themselves in costs of the product must first be controlled at the department spending level. Again merchandising has an advantage over the manufacturing or metalworking industry in determining the two fundamental reasons for spending money:

1. The load or activity in the indirect department is better defined.
2. The cost of satisfying that load or activity is isolated.

Again, as in manufacturing, these indirect or staff department's costs are related to

1. The activity of a major part, or the entire selling activity
2. The department's own work load, which is spelled out.

It has been demonstrated that basic units of work measure are clean-cut at point of origin, and they still remain clean-cut when used in the control of an indirect department. In those indirect departments, which have their own work units as a measure for doing work, such as accounts receivable, accounts payable, payroll, customers' complaints, receiving, shipping, and similar departments, either visual, physical, or clerical elements are the basis for measuring the work performed. In the larger department stores, it is common to have detailed time standards covering the various operations, with spelled-out types of variations for the many operations performed. It is also common usage to have defined in detail the clerical and handling methods and procedures as part of the work-simplification program. At the department doing level, then, a variable budget in nonselling departments is comparatively clean-cut and reasonably easy to prepare, based on scatter charts which are the results of immediate past experiences. Attention is again called to the fact that when a "scatter chart" is prepared from the past, unless that past has a consistent and normal pattern, much care must be taken in establishing the final trend line to be sure that *lag* (see page 137) is not frozen into the plans for the future.

A Study on Allocation of Indirect Costs to Selling Departments. Distribution of nonselling-department unseen costs to merchandise lines in the average department store depends on the desire of top management to learn the true facts of profits by lines of product. It is obvious that the more lines, the more involved and the more important this problem becomes. It should further be obvious that close control of profits requires a high degree of shading in the reasons for profit variations, of which, in a retail store, the internal mix can be a major factor. This is of maximum importance because most department stores have a large share of their annual business concentrated in November and December, while a disproportionately small share occurs in the months of July and August, for reasons which are well known in the trade. Further, habits of the past have created other seasonal sales patterns in certain lines, such as furniture in the early parts of the year. The patterns peculiar to certain goods contribute to a constant distortion of the normal or average yearly relationship of individual product lines to total sales.

This shading of the effect of profits caused by product mix is important in a department store. Under sophisticated management, steps are taken to see that this variation as it affects profits is well analyzed in order to ensure separate high-lighting of the profit fluctuation, which can be detailed as the amount due to distorted or usual seasonal variation from normal mix (see the laws of profits, Chapter 6). To perform this function requires a satisfactory distribution of the nonselling departments to the selling departments and thence to the lines of products. In most retail organizations, this distribution is usually accomplished by loading the departments of highest volume with the greatest amount of assessment based on current relationships. This is a basic fallacy. The assumption that the higher the relative volume, the larger proportion of costs a department must carry, is a completely erroneous concept. Since costs are made up of standby time costs (readiness to serve) and variable costs (volume controllable costs), the principle of loading to the department with highest volume is unsound. To get the modern techniques working requires standby and variable factors. The standby cost should be allocated to lines of products through selling departments on a normal readiness-to-serve basis, while the variable costs should be allocated on a volume, or output, or current-service-rendered basis.

Single-expense Accountability and Organization Control to Earn a Profit. Many department stores are rife with political chicanery. The word chicanery here does not imply dishonesty, but rather a knack for conniving which seems to magnify itself as the people who control the destinies of the organization increase in number and background of selling experience. In no section of the economy are people greater salesmen of a product, and yet the poorest salesmen for their own ideas. Too many department heads are astonishingly naïve when it comes to values and lack business sophistication so far as control of costs and generation of profits are concerned.

We have been horrified at times by the antiquated methods used to measure and interpret value relationships in the accounting and cost departments of some of the larger department stores. We have found places where the rank and file of decision-making accountants are so vindictive and arbitrary about their 25-year-old methods that they will not listen to a new idea, let alone try it. There is no better place to install modern equipment and flow accounting to control millions of transactions than in the average retail unit of any size. Even small retail units could afford to appraise manual "flow" methods. The costs of retailing today are burdened with too much paper work performed by too many people who work from nine to five at too high a cost. This cost must be reduced for survival.

It is fundamental that if a sales type of company is to have a semblance of breakeven and variable budget control, its success depends on the man heading the program. He must have sufficient selling experience to know the philosophy of the selling people's minds, must have enough of an accounting background that he can beat down the prejudice of a landlocked accounting department, and must believe that there is variability as well as standby in the costs of any operation. Such people are needed in order to carry out the fundamental principles of scientific budgeting and profit control in the average retail organization. The future of merchandising depends on some mental sophistication and physical gymnastics in the process of orderly cost control and profit thinking. Gross margins are slowly but surely disintegrating because of the competition of the mail-order and chain-store influence. The costs of merchandising and the costs of keeping costs are constantly increasing, squeezing, slowly but dramatically, the profit margin available for a return on the investment.

Too many merchandising institutions have a ratio of nonproductive to productive labor which is staggering. This condition will never be corrected by icepick methods applied once or twice a year. This process is so disturbing to *esprit de corps* that icepick methods of reduction done dramatically at irregular intervals are offset by the loss in efficiency among those who remain.

These problems of relationship between nonproductive and productive selling hours can be improved only by capital expenditure, time and motion study, work simplification, and new methods of accounting. Some hope lies in electronic computers and totalizing equipment, which would record by sales lines almost immediately the number of transactions and the values of these transactions by lines. In this original accumulation of data, all information needed for accounts receivable, markup, markdown, operating costs, both labor and material, and other pertinent operating statistics would be derived as a by-product. Another costly habit in retailing is costly daily and weekly aggregations of "unofficial" figures which are substantially duplicated from independent procedures at the end of each month. Under flow accounting, the "unofficial" become the "actual" as the month develops. In flow accounting and breakeven control this philosophy of unofficial, preliminary compilations will disappear. It is obvious that closed minds can delay these simple yet important concepts beyond the time needed to save many selling organizations from destruction by lower markups and higher costs.

Keeping Department-store Management on a Profit Track. Keeping the management on a profit track in a department store oftentimes is a difficult process. Too many of the key executives in retail selling make an annual forecast and then relax. If times are good, they wear themselves out patting themselves on the back. If times are bad, they make all manner of excuses usually based on the faults of the economy beyond their control. They rarely consider the expenditure side of the profit picture until things are completely out of hand. They continually moan about the external or sales side of falling volume. This continues until the fall off is so pronounced or of long enough duration that something must be done about operating costs. This is usually done in a poorly planned staff meeting, in which arbitrary decisions of cost reduction are universally applied to all departments on a percentage basis. Such a practice has unsatisfactory results because those departments which have been lax in the past get no more severe treatment than the department which has kept its nose to the grindstone. This invariably results in an undermining of the efficiency philosophy during good times. After this "treat all alike act" has been applied several times, the efficient relax, for each time they suffer by their efficiency. To be successful and to keep the gross margin on an even keel, retailing management needs:

1. A breakeven point and breakeven philosophy
2. Breakeven points by major lines of products wherever profit shading is important in decisions
3. Standby and variable cost factors to support breakeven points and provide dynamic, segregated, daily and weekly departmental control

4. Records (official) of running results compiled on a "flow" basis

All four are necessary and must be sufficiently sensitive to record the income effects of markup, markdown, shrinkage, employee discounts, and volume variation as they affect unit sales and therefore the breakeven point. Against income there must be a measure of costs based on selling volume reported at least weekly as a by-product of flow accounting. The deficiencies of the costs of selling, if left to monthly controls, can clip away too much profit because it takes too long to find out what the true costs are.

We cannot emphasize too strongly the importance of flow accounting in a well-operated selling retail organization. It is even more of a natural than similar processes applied to the average manufacturing concern. Records of sales transactions and of the costs which make them possible can move in a steady flow from the labor ticket and from the sales slip to the profit and loss statement. The department-store operator who waits until the end of a fiscal period to consolidate and summarize these basic data will find himself unable to compete with the going trend of close cost control which has been a major factor in mail-order and chain-store competition.

The 13-period Calendar. The 13-period calendar, consisting of four-week periods, is even better adapted to the needs of the business organization in close contact with the consuming public than is its counterpart, the four-four-five-week quarter, so helpful in manufacturing control. A four-week period is natural and normal in retail accounting cost and control techniques. The common denominator of one week is by far the best for flow accounting, cost accumulation, and control analysis in a retail organization. Its use strengthens the comparison of like weeks, periods, and seasons. The shorter cycle of a week minimizes the lag which is now so pronounced in department-store accounting. The usual monthly reports under present methods display results which are 10 to 20 days old before operating heads receive them. The combination of flow accounting and weekly control segments is a major step in the advancement of retail accounting and control. It is one way of getting immediate attention and prompt action by executives who are really interested in today's problems of stemming the tide of increasing costs. A more current "look-see" summarization of official results saves many dollars in operations and the costs of making sales.

Conclusion. Too many retail organizations live in the glories of the past. They accept the concept that the only principles of measuring their business are static, not dynamic, methods. Application of the variable budget and breakeven-point control is highly adapted to large retail operations because activity can be so cleanly measured not only in dollars of sales and costs, but also in units of output. Instead of mediocre control, department-store results should reflect exceedingly sharp and competent control. Changes in selling price can be isolated, and the three reasons for profits clearly defined (see Chapter 6).

CHAPTER 25

EYE-CONTROL MANAGEMENT

Introduction. Despite the old cry that "the hand is quicker than the eye," experience has demonstrated that as far as business is concerned eye appeal in presentation helps management summarize facts and trends for a decision. In short, there is no better way to present facts than by well-engineered, expressive charts which display *trends* and reflect important variations in *color.*

This chapter deals with watching the profit path develop as a good or bad performance.

Charts in Profit Measurement. The most common means for measuring profit and stating conditions of the past are the profit and loss statement and the balance sheet. These statements are used by all classes of individuals to form on the basis of past experience an opinion about the effectiveness and efficiency of the management in the organization being measured. A banker looks at these statements to determine how safe it is to lend money; a supplier looks at the same statements in granting credit; the stockholder looks at these same documents to see if his money is being wisely turned over and is making a reasonable return. Management repeatedly uses these statements to sum up and explain its results.

Charts for Directors. Let us go to a "run-of-the-mill" director's meeting. Among the first items on the agenda is the treasurer's report. This is usually written around a profit and loss statement and a balance sheet from the latest available figures, which can range in age from two to six weeks, depending on how long it took to get the information prepared and on the timing of the board meeting itself. During the meeting a question may come up concerning inventory; the comparative balance sheet says there was $3 000 000 at the end of the last accounting period as against $2 335 000 the year before. "Why was it higher?" And after scurrying through many papers somebody in management proceeds to give a number of reasons. Many of these answers turn out to be incorrect when they are verified, though in giving them there is no intent to deceive or to be dishonest. And so goes the meeting. The inventory situation leads into a discussion, and someone wants to check the inventory in the last four years. This requires digging into the past statements which clutter up the board table, resulting in such complication that when the meeting is over the participants usually fail to get the impact of the statistical answer which developed in the presentation of this information.

Let us now take this same director's meeting and prepare charts for the profit and loss statement and the balance sheet. Used for illustration (Chart 40) is a typical chart of inventory covering the past three years by months; while these are *static* charts they are good for interviewing the past as prologue. Breakeven data should be used to supplement this for all current activity as well as for looking into the future.

Here is a synoptic visualization of the closing inventory balances on the last 36 interim balance sheets, with years distinguished by color. Not only can one color be followed showing

TABLE XLVII. INVENTORY VALUES

WISCONSIN MANUFACTURING CORPORATION

(In millions of dollars)

Month	1951	1952	1953	1954
January	4.1	4.4	4.4	3.6
February	4.3	4.7	4.2	
March	4.7	5.0	4.2	
April	4.0	4.7	4.0	
May	3.9	4.0	3.8	
June	3.6	4.0	3.5	
July	3.2	3.8	3.5	
August	3.7	3.8	3.6	
September	3.8	4.0	3.0	
October	3.9	4.3	3.0	
November	4.0	4.5	3.2	
December	4.0	4.5	3.3	

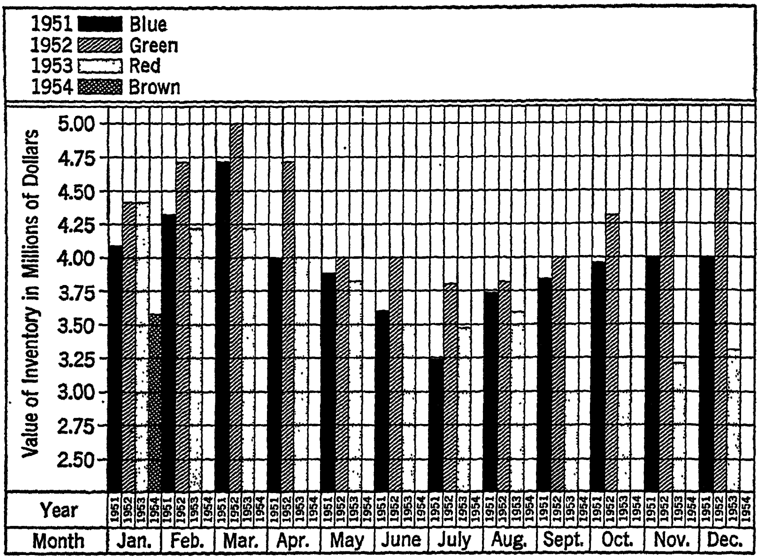


Chart 40. Inventory comparison by month, 1951–1954. Data for this chart come from 37 detailed statements. Summary form is shown in Table XLVII.

the trend for any one year, but the relative comparison for any one month for several years can be seen at a glance. Somehow the clutter caused by all the details necessary to find comparable information in a series of statements destroys visualizing the trend of variations. Not so with the chart. It hits clearly and concisely. Obviously a series of charts representing both the balance sheet and the profit and loss statement will make cleaner, more direct presentation than row upon row of figures which must be appraised and digested before they can be used by the man who must get a lot of information to make major decisions in a short period of time—a director.

With this thought in mind the management who must present facts to the directors will find the color chart the simplest way to express and sell problems to his bosses, quickly, thoroughly, and without any misunderstanding.

In one company with which the writer is closely associated, a detailed balance sheet or profit and loss statement is no longer prepared for directors except at the end of the year as prepared by the public accountants. All the important items—cash, inventory, accounts receivable, income taxes, fixed assets, net worth—appear in charts similar to Chart 40. The profit and loss item of sales, unit selling price, unit cost, cost of sales by material, labor, and burden, components, profits before taxes, profits after taxes, and a breakeven point similar to the one shown in Charts 30 and 31 are shown in place of a detailed profit and loss statement. While these are again all *static* reports, they are the results of the interworking of variable cost, breakeven, and coordinator controls which are *dynamic* as a method of visualizing what has happened at one and only one condition of volume. They serve their purpose provided that any question raised can be answered by the type of *dynamic* presentations we have detailed throughout this book. A board of directors so informed can better discern the effectiveness of management in meeting the problems because the chart compactly presents two important factors necessary for quick conclusion:

1. History on a common basis of presentation to present facts
2. Trend

Throughout this book we have used breakeven charts in various ways. Now it is time to use one to see how "what is going on" can be better analyzed. Note the breakeven chart of the Wisconsin Manufacturing Corporation (Chart 41).

A synopsis of what happened in the Wisconsin Manufacturing Corporation saleswise between 1940 and 1952 is clearly reviewed by the figures at the bottom of the chart. The eye can quickly tell proportions without any analytical work, for example:

(*A*) is the low volume of output illustrating the ebb year for the Wisconsin Manufacturing Corporation.

(*B*) represents the spread between the low year of 1941 and the high year of 1952, giving a quick résumé of comparative capacity and these years in proportion to other years.

(*C*) shows the breakeven point, and the following can quickly be discerned:

Its relationship in rough proportion between no capacity on the one side and 100 per cent capacity on the other

Its relationship to the low volume as measured by (*A*), the high volume as measured by (*B*)

Its relationship to the average volume as measured by (*D*), and the maximum capacity as measured by (*E*)

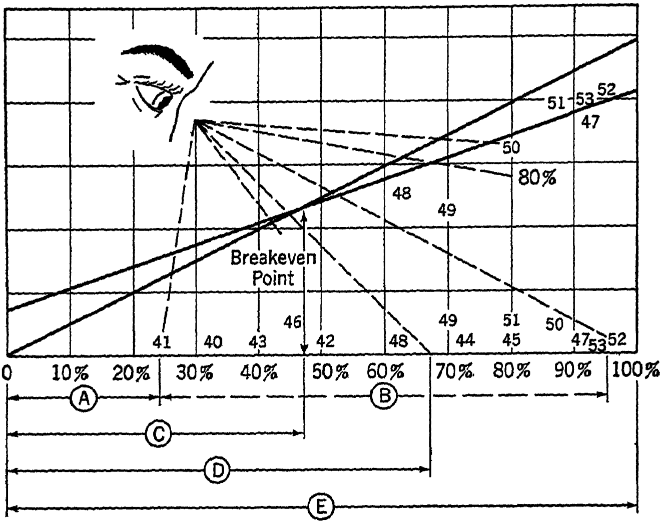


Chart 41. Eye use of breakeven chart, Wisconsin Manufacturing Corporation.

(*D*) illustrates the mean for these years and represents the average volume and direct percentage to that mean.

(*E*) shows the potential maximum capacity and what proportion of this capacity has been accomplished at any given point for the years illustrated.

The chart itself not only indicates the breakeven point but shows the trend of expenses as an up cycle between 1949 and 1952 and a down cycle between 1947 and 1948.

While breakeven points are primarily intended to show the point of profits down to where profits turn to losses and losses to profits, they also indicate the potential profit possibilities for any product line or company. The illustration is an attempt to show a more generalized use of scatter charts for doing quick analytical work for any proportion. It should be extremely valuble in top management to get a quick review of what has happened and what is happening and to furnish the board of directors' meeting with related facts without burdening it with an undue amount of statistical data.

Color in Controls. There are many uses for color in cost control. With a little engineering foresight it can be used in helping all levels of supervision. For example, shop paper systems make good use of color to signal significant conditions.

The top of the payroll ticket is of solid color. Four to six colors are used to distinguish between the types of labor and the type of variation from standard being encountered. The very act of applying color to these tickets so that color means an exception has the effect of creating a supervisor's control of labor costs on the spot, thus reducing to a minimum the potentials of *lag*. The supervisor on the floor knows that red, green, blue, and brown tickets mean troubles of varied types. Since these special colors are but a small part of the total number of labor details flowing through his department, he concentrates his attention and energy on these tickets while the work is being performed; consequently, he gets better results by dealing with exceptions when they happen.

While this illustration may not fit your particular application, the use of color to discern right from wrong, normal from subnormal and from excesses, improves the chances of isolating and controlling the few variations as opposed to constantly dealing with the great mass. As business becomes more complicated, the whole process of control tends to be lost in a "snowstorm" of details; poor results are covered by the mass of normal items of conduct.

Conclusion. Management in its endeavor to hold a respectable breakeven point and an acceptable profit path falls back on the profit and loss statement and the balance sheet as a recap of past conditions and in order to resolve internal dynamic controls to the basis for external presentation. This will continue. The breakeven point and its subsidiary factors, the use of well-designed and engineered charts of accounts, and the application of color to signal variations from normal are the more advanced methods that a wide-awake management uses to fight adverse variations in profit paths.

CHAPTER 26

BETTER ACCOUNTING TECHNIQUES

Introduction. In order that a busy executive may have an insight into the building of sound, orderly, and quick control information, to which he is entitled without a complete duplication of the present accounting and cost records, and in order that he may get more value from the present high costs of keeping costs, this chapter summarizes the requirements and specifications for more orderly cost information. It is hoped that from these summarizations the executive who wants good reports will be able to point out to his figure men the basic steps which must be followed to overcome cost deficiencies.

The number of executives who say their present costs are financial "comic books" is too great. Such a statement is an indictment of all of us and mainly of management itself. There are several reasons why present cost records are unsatisfactory:

1. Management does not give cost-accounting details the time they deserve.
2. Management does not clearly spell out what it wants.
3. Management is too willing to accept a conglomeration of subsidiary reports which have no background in proportion to the total problem.
4. Accounting people still think too much in terms of tax returns, interim profit and loss statements, and an annual audit.

Many of these problems can be solved by a heart-to-heart talk and a little effort between the people who use figures and the people who prepare them. This synopsis voids the technical difficulties in developing sound costs and accounting, but attempts to give management a clearer picture.

What Is Accounting? In Chapter 3 it was spelled out that accounting is an exact science, dependent upon our human abilities to measure facts by a given set of rules and precedents established by law and practice. In its present form it is intended to protect, not management, but the casually interested person, the banker, the creditor, and the stockholder—people who cannot watch the day-by-day movements and who must be content with generalized comparisons usually available once a year. This requirement creates many technical problems in accounting, which attempts also to serve a management that must have a "look-see" into affairs hourly, daily, weekly, and monthly. Because decisions must be made in management terms, the shading of good and bad dollar values and proportions reflecting units produced, excesses, scrap, rework, overhead costs, and hundreds of other items must be reported in management terms. To be useful for control, cost records must not be obscured by the blanket of accounting techniques if they are not to lose their purpose. Control accounting does not in any way destroy the final summaries so necessary for formal accounting. To perform this transformation requires first a better knowledge of the problem. Accounting and costs must be the by-product of good control reports rather than the present general method, which is the reverse of this philosophy. In short, should the "tail wag the dog" or vice versa?

Why Are Costs Kept? The reason for keeping cost data depends upon the point of view. If the question is referred to accounting people the answer will be along the following lines:

1. To cost sales
2. To relieve and value inventory of all types
3. To help in estimating new costs of changed products or of new products
4. To prepare interim financial reports without taking a physical inventory each interim period (usually a month)

Management wants cost information for three extremely important managerial reasons which vary somewhat from the accounting requirements given above.

1. To control running expenditures *where the money is spent* and *when it is spent*, and to recap these expenditures as soon as possible against a standard of performance

2. To fix responsibility either within the organization or outside the organization (customer billing) for cost of services rendered
3. To improve the process of estimating the cost of new jobs or products, or other new or revised situations

To sum it all up outside of the technical requirements of accounting to close the books and to prepare adequate audited financial statements, the real purpose of all the figures we keep are to help management (1) see its problem, (2) proportion the subdivisions of the values that it sees, and (3) use the figures that measure results to express to subordinates what is required of them to carry out tomorrow's objectives. It is just that simple. We must design our reports to produce this kind of a result.

Rituals of Cost Accounting. Cost accounting has not grown with the changes in the size of business-organization structures. "Costs" are an attempt to measure what was spent for a given segment of work after the work has been completed. They are complicated in their completed form by the proportion that the particular item costed bears to the total of all items during the production cycle. Costs are further distorted by the constant conflict of the increases and decreases in inventory which come between the input of material purchased and labor paid for and the final charging as cost of output. Resolution of confusion in this cost interchange depends upon a physical inventory which, because of the size of the inventory and the complications that exist in most companies, can be taken but once a year. Interim costs are no better than the ability to control inventory surpluses and deficits, which ordinarily too often come as surprises after the physical inventory has been evaluated and compared with the book figures.

Standard vs. Actual Costs. The conflict over the relative desirability of actual and standard costs in the minds of management is primarily caused by confusion in thinking through the real cost problem. There are still too many managements who think that the word *actual* means a more accurate cost than a standard cost. In most cases this is far from true, because in modern business the control of costs must be where the money is spent. The reliability of costs, either actual or standard, depends on the ability to bridge the gap without voids between the time the money is spent and the time it is recorded. The longer the cycle of manufacturing, the greater the labor content; and the more involved the overhead, the more important this problem becomes.

Standard costs have the advantage of excluding from inventory values unusual or nonrecurring items when the money is spent and then pinpointing these excesses for management at the time the material and labor is paid for, not after it is sold.

There are merits in both systems, but certainly there is no merit in the generally assumed proposition that actual costs must be better because they are *actual.* In looking at the ability of the cost system to measure facts and to help control expenditures, the following questions should be asked concerning the cost system in use:

1. Does the system disclose cash facts by cost subdivisions at the source of expenditure?
2. Is the system tied in with *time* factors which measure efficiency of results without losing the impact caused by changing volumes?
3. Is there a clear reconcilable figure channel to bridge from product cost to department spending or from department spending to product cost? This is shown by the flow in Illustration P.

*Department Doing (Control Level)**	*to*	*Department Charged* →	*to* →	*Line of Product (Recording Level)*
Department A		Department M		Product X
Department B	serve	Department N	which produce	Product Y
Department C		Department O		Product Z

* Made up of many individual cost transactions intermingling with different starting and stopping dates.

Illustration P. The costing process.

In today's complicated structure between the department which spends the money, the department charged for the money, and the product line on which costs are based, for cost-sheet recording, it is too easy to lose busy management men in the "gullies." Has something been done to engineer this irritating condition by simple coordinated controls? Or is this simplicity a fantasy which is long in theory and short in practice along the process of value charging to its final resting place, the cost sheet?

The Idea of Department-doing Control. As previously stated, the best cost-summary sheet is sterile in providing intimate cost comparisons. This is true because the final part or product costs lack the following important relationships:

1. Final costs are not expressed in terms of organization structure and people who spend the money.
2. Final costs are full of estimates and percentage distributions, none of which can be clearly traced to the source of expenditure—watchmen, maintenance, insurance, etc., in the problem of explaining reasons for poor cost results.
3. Most cost sheets are accumulated days, weeks, and months after the expenditure, thus making it hard to revisualize the act or acts questioned.
4. Final costs are based on output (reduction from inventory). Operations are based on input (increase of inventory). The costing problem becomes more laborious and definitely more involved as the turnover cycle lengthens.
5. Final costs fail to express clearly or allow reasonable reconciliation of the relationship in the interplay of volume variables created by high or low volumes in other costed products.

It is not the intent to say final costs—actual or standard, or variations from one extreme to the other—are useless and a waste of time. This is not true, for final cost summaries serve a very useful purpose in recapping cost information primarily for accounting purposes, and final cost summaries are essential in determining profits by lines of product. The contention is that, because of their type of makeup and the time consumed in compiling, coupled with their lack of tangible expression in terms of organization structure, they fail utterly in the act of measuring the efficiency of specific costs as created.

Since they are a necessary part of any good historical profit and loss system, but since they fail to control the profit possibilities at the source, the problem of control of costs is one requiring two major considerations:

1. How to accumulate information for control of expenditures at the source
2. How to do this accumulation in (1) with the least amount of duplication so that the source material will flow directly to the profit and loss summary in traceable steps

Nothing is more discouraging in cost control than to follow a supposed source of costs in the "department spending" state only to find that the accounting information is entirely different when issued weeks later; and nothing is more frustrating to the supervisor than to be unable to follow some costs back from a product cost analysis to the source, never being sure the investigation is covering the same facts in the evolution process of tracing poor cost results to the details from which they come. If costs cannot be built from department spending to line of product, they seldom can be clearly retraced from line to cost center without a complicated, time-consuming, and disappointing reconciliation, thereby losing most of the original force because of unsupported and challenging assumptions necessary to get back to the source of the charge or charges.

Planning Better Cost Habits. Most will be convinced in answering these questions that we must plan better cost habits. Functional controls are needed, reported in forms which are (1) subsidiary functional cost ledgers at the department-charged level, and (2) segregated in a well-engineered accounting charging nomenclature which allocates the dollars spent to centers of organization responsibility. Although this kind of reporting frequently exists, its fundamental success requires that the dollars reported against supervisory-control subdivisions must also be the same dollars that show up in the final trial balance.

This procedure requires revamping and rearrangement of the present techniques of accounting and costing. These shortcomings are not usually discerned by superficial inspection; it requires digging. If one digs enough he will invariably wonder how he ever managed on most present cost procedures. With a little thought and study, all the records which are now the raw material for an accounting trial balance or a cost sheet can be tapped for useful management information with but slight rearrangements in procedure. With the help of flow accounting and costing, an engineered card of accounts, a better method of distributing costs from department doing to line of product, and with breakeven support for the normal rate of overhead, there can be resolution of the conflict between management control and accounting procedure.

Flow Costing. Flow costing is nothing more than the process of accumulating and reporting summarized cost and statistical information in quantity and in value as the action happens, as the by-product of the present basic accounting records. Productive material variance, labor, payrolls, indirect materials, and all currently controllable business costs can and should be distributed, summarized, and reported on a daily running basis. They should not be hidden in general ledgers and other forms of accounting records until the end of a fiscal period. Many accountants claim that this daily flow will multiply their work. Case after case has proved that this is not true. Daily control simplifies the work of balancing figures now balanced monthly. The staff works more efficiently early in the month and can issue information reports in the time otherwise lost in accounting and cost departments at the end of the month in running down and correcting errors. There are two reasons why this is so:

1. By tapping the information currently and placing it in the hands of controlling supervisors, errors are found while still "warm." Thus, each supervisor becomes an unofficial auditor causing the correction of the information at once, not at the end of the fiscal period.
2. The transactions of a business are unfolding every moment. It is certainly better planning in the accounting department to compile and consolidate this information as it flows rather than to burn the midnight oil in getting out an unsatisfactory and late report at the end of a fiscal period.

Cost Simplicity. Our present costing methods, so inadequate for good control, are even complicated from a user's point of view when restricted to their minimum requirement, i.e., accounting closings. It is not uncommon to find segments of a cost sheet with figures carried out to the fourth and fifth decimal place, figures that no one can visualize or understand. To illustrate: $0.0009 may be the correct cost for a particular item. Can you read this amount? Can you visualize it? Most of us have enough difficulty when we get to the third decimal place. Just because the single unit may be the standard of measure is no reason why a cost sheet should not be recapped in units of a hundred or a thousand. For example, $0.0009 per unit would be $0.09 per hundred and $0.90 per thousand. The figure begins to take on normal expression.

Another shortcoming in costing techniques is that in voluminous cost records the high-costing items are the "salt and pepper" in hundreds of small items which make up the total. We are not trying to say by this that one cannot save money by knowledge of the small items; that is not the point. But we do say that in most existing costs all items are treated alike and thus emphasis on value is often lost in length of detail. Cost sheets should be laid out in summary form at least to express value proportion. It is not uncommon to find that 80 per cent of the value is in less than 20 per cent of the items. Because of this, cost-summary sheets should be laid out to reflect these value shadings of managed values.

Cost from Department Doing to Line of Product. Once standby and variable factors are established for measuring performance, distribution of costs from the department that spends to the product that benefits is not only easier but is also more accurate and meaningful. If the philosophy of standby and variable cost response to output is true, variable costs should be distributed on the current use of facilities (value), and standby costs should be assessed in relationship to *time* (long-term use of services). Recognition of current service rendered separated from long-term readiness to serve in distribution will improve materially the understanding of the reason and equity of the distribution. No longer will supervisors contest their shares of assessed charges on the grounds that the distribution is without equity, rhyme, or reason.

Establishing Normal Rates of Overhead. The process of determining overhead rates or "shop-burden rates" is too often a farce. Too many people think efficiency and low cost are simply a matter of a low overhead rate. Many times overhead rates are set at the level that suits the boss, not at justifiable levels. When a large amount of unabsorbed burden accumulates as a charge against general profits, failure to give proper weighting to relative product costs results. In the past, it was felt that the more that could be forced into "direct labor," the better the control; this kind of thinking will not stand analysis. As a company develops standby and variable overhead controls at the department level, this false security disappears, for overhead is also detailed and controlled. Control will be sharper and costs will in the long run be less despite the paradox of high overhead rates if care is taken to exclude from prime labor and material costs any item which seems to fit these tests:

1. Cannot be seen directly in the finished product
2. Is not applied uniformly to each unit of like product
3. Costs more than a dollar to account for a dollar's worth as a direct cost

Conclusion. The cost of keeping costs is out of line for what we get in results. This is not an accounting problem; it is a management problem. It requires the same kind of constructive thinking, cooperation, and honesty on management's part as it does on the accountant's. Define your objectives, eye your organization structure, and then build a better cost system which flows in a simple, orderly process to product lines and the profit and loss statement without chaos, confusion, or loss of time. It can be done if those in authority are willing to do some constructive work in a problem which is usually sloughed off and passed on to the figure men who must fight the tide of front-office complacency.

CHAPTER 27

CONTROLLERSHIP

Introduction. Since there is such wide dispersion between the thinking of the custodian of accounting information and the thinking required by management in the operation of an enterprise, it is necessary, before we proceed to fill management's requirements for *time* control, that we recognize a twofold problem:

1. How can we overcome the shortcomings of accounting which have been described as they affect management?
2. How can we provide these urgently needed rearrangements and not require duplicate data to supply the needs of the formal accounting requirements?

The individual who is responsible for solving these problems must not be steeped in debit and credit thinking, but must understand these technical factors.

Controller vs. Accounting. From the above it would appear that we need some superman who can carry water on both shoulders in order to perform this task. The need for a superman is less than the need for broadening the concepts of the men who are now employed in collecting and disseminating information, and in attributing values to the acts performed which lead toward control of profits.

It is believed, however, that certain types of individuals will never be able to reconcile themselves to the requirements of true controllership and to the breadth which is needed properly to serve management.

The Real Controller. Management, therefore, must develop and have at its disposal an individual or group of individuals who can understand the narrow limits in which accounting moves, but who first can cope with the broad limits in which management works, without costly duplication and chafing of personalities.

In the past 10 to 15 years the place of the controller has assumed greater magnitude in the average organization. Those controllers who have risen to the occasion have found that the function of control with positive breakeven and capitalgraph support for profit and loss statements and balance sheets requires the ability to produce reports which can be used to recap details and provide intimate control quickly at reasonable cost without duplication of effort. They are men who understand the problems of accounting, production, distribution, and design and process engineering. Those who have performed a function other than accountancy in their companies in the past are not disqualified from becoming controller.

The Functional Responsibility of the Controller. A controller is always a functional man in the organization. This does not mean, by inference, that the controller could step into management's place on a moment's notice, nor does it exclude him from this possibility. It does mean that the controller assembles statistics in a form which can be understood and comprehended without undue conversion and reconciliation, and that in so doing, he thinks from the management viewpoint.

The Controller's Boss. To whom should the controller report? What are the objectives of his reports? Are they to furnish information to an individual whose responsibility is to work with or independently of the operating organization? These are not easy questions to answer and depend partly upon internal conditions such as the respect the board has for the operating heads, the strength of the president as an executive, and his background and training as well as his ability for value expression. It depends upon whether the organization works as a team or a "one-man show."

If the controller reports to the board of directors and does a good job, he is bound to make decisions of interpretation and reports which appear to criticize individuals within the organization. If he does this, he is like the umpire of a baseball game who cannot really be "one of the team." He is set apart.

This isolation often limits the controller's usefulness because in order to get along with his daily associates he must "soft-soap" the reports to his bosses, the board of directors. On the other hand, as the controller reports down the organization to the president, the operating vice-president, the treasurer, etc., he becomes a part of the organization; he thereby loses much of the effectiveness he would have retained as an independent interpreter of facts, which existed when he reported direct to the board. Certainly, the controller should not report to the treasurer, because to do this he must submerge himself in the physical accounting-routine control technique and will probably reduce his status to that of a super bookkeeper or perhaps a debit-credit accountant in the process.

It is necessary to analyze carefully and to constantly review not only the responsibilities of the controller but also the organization's objectives in order to make sure that the function of controllership will be dynamic, forceful, and objective; and yet caution must be exercised to avoid breaches in the operating organization. The controller must be an individual who can control profits without destroying the *esprit de corps* of his associates.

The Controller's Functions. In 1953 the Policyholders Service Bureau of the Metropolitan Life Insurance Company, with the assistance of the Controllers Institute of America, made a comprehensive study of the functions of the controller. A summary appeared in a publication of the bureau entitled, "Functions of the Controller," which the reader may obtain. It is too lengthy to reproduce here but is a composite record of the duties and responsibilities of the controller as reported by the companies included in the survey. The activities have been grouped under related headings and arranged approximately in the order of their frequency, and cover much important subjects as general accounting activities, financial reports and statements, auditing, budget activities, inventories, office management, statistics, taxes, special reports and investigations, and miscellaneous and occasional assignments.

In any organization scheme, regardless of to whom the controller reports, care must be taken to define with visual limits the individual functions of the controller, financial vice-president, treasurer, chief accountant, auditor, cost supervisor, and the industrial-engineering sections. It is presumed that there will be an intermingling of their duties and responsibilities if they are all to get their information from the same value details flowing toward the final debit and credit accounting. Any organization structure must protect this requirement to cut to a minimum duplication of effort and to make sure that the controller has sufficient responsibility so that his functional powers will not be usurped and minimized, and so that the other fiscal officers will realize that limitations are primarily with the accounting and costing conduct of value determination.

There are many books on controllership, and the Controllers Institute of America has a very specific summary of the normal duties and qualifications of this position. A summarization of controllership functions follows: [1]

1. He Must Obtain Facts—Honest Facts. Contrary to the accounting or bookkeeping attitude, the controller cannot accept the apparent evidences of transactions for incorporation in his accounting records and statistical records without that further analysis which will entitle him to recognition as a true controller.

His responsibility goes behind the original piece of paper and extends to the conditions surrounding the initiation of the train of events that gives utterance to the "original evidence" of the transaction.

He must be able to judge the soundness of the wage system, for example, or the wisdom of the pricing policy in effect. He must be able to foresee the significance of events before final commitments; and when he sees danger ahead, he must know how to be vocal about it in a diplomatic fashion. In other words, he must be able to know when the kitchen needs a cleaning and why the cleaning is necessary.

2. He Must Highlight Variations from the Plan—Exceptions. Since management usually follows some basic policy or plan, the current results are important only as they reflect the realization of such plans. Perhaps the controller will have some difficulty in discovering whether or not a plan of action exists in management's own mind, but find it he should, and measure results against the plan he must—if he is to be a controller.

By highlighting, the author means presenting effectively and strikingly so that significance is not hidden beneath irrelevant figures and facts. In order to highlight, the controller may be forced to abandon, or subordinate, the usual forms of statements.[2] Bar graphs, trend charts, and other devices may be useful, but as he does this work his capacity for ingenious presentation will greatly increase his usefulness.

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[1] Reprinted from Fred V. Gardner, *Variable Budget Control,* McGraw-Hill Book Company, Inc., New York, 1940.

3. *He Must Point Out Possible Courses of Action and Their Significance.* In a sense, the controller is an educator extraordinary to his management. He must keep his fellow officers alive to new things and alive to the consequences of their policies. To illustrate both the kind of stimulation we have in mind and the fact that the controllership's functions may not always rest with the nominal holder of the title, the author is reminded of a young secretary of a large and successful chemical company. Some years ago when his appointment seemed to him a vast step upward, one of the company's directors dismissed the matter by saying, "We just wanted a good stenographer who could keep his mouth shut." A few years later the same director commented, "That boy has ideas and good ones. He certainly keeps us going, and we must have another board meeting tomorrow to consider some more things he has dug up about our business."

4. *He Must Protect against Economic Trends.* From several points of view, the effect of economic trends should be one of the controller's prime interests. It is unnecessary to do more than point out the many successful companies whose current products have been discovered or developed within the past 10 years. As certain lines of product reach economic maturity and begin to slide downhill, the controller is in an ideal position to gather the facts that often indicate danger signals. Such information is a natural by-product of his cost accounting and profit and loss activities.

He must be something of a market analyst as well. When we realize that the guardian of the purse strings can encourage phenomenal changes in the character of the products or ventures into new fields or can discourage those dreams which have not been checked against potential markets, we can well see his great capacity as a protector against economic trends.

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[2] Development of the rule of exception includes the ability to design exceptional reports—reports which give variations from normal, which sift the volume of accounting detail and record the "meat" without losing the proportions and balancing totals. This is an important phase of the controller's job.

5. He Must Spearhead Management Audits. What is auditing? Auditing is commonly thought of as the process of checking the accounting figures to see that the profit and loss statement and balance sheet are factual, and that they are in accordance with standard practices and the requirements of revenue and corporate law. However, auditing in the average business is much more involved than that. Every business should undertake an organization employee-relationship audit, routine review at regular intervals—at least once every five years—for one of the sure ways to get a breakeven point down and reappraise the standby and variable factors which support the breakeven is to make an audit of the organization, methods, and procedures in the business. This "human" audit is one of the major functions of the controller. He must stem-wind its preparation for management.

These, in general, are the author's ideas of the obligations and responsibilities of the controller. The primary purpose has been to apprise you of the broad, generalized requirements and to emphasize the facts that he has to understand the fundamentals of accounting in order to talk to the accountants and that he must understand the problems of management in order to express himself to management.

Conclusion. Somewhere in between what is given here and the detail and scope of the controller's functions listed by the Controllers Institute of America, the reader will find a philosophy for control which does not usurp the powers of accounting but which does broaden the possibilities of capable management. Before a real control plan can be instituted in any organization, this philosophy by a man who is capable of guarding it is necessary if profit-path control is to be reasonably successful.

The controller must reflect the common denominator of which the breakeven point and its changes are the crux in order to improve his company's opportunities to produce profits. He thus becomes the custodian of the breakeven point, from which the results of the company can be compared to the past and planned for the future, gaited to a dynamic business and management.

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